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Challenges of tele-rehabilitation in children with disabilities in initial education

Desafíos de tele-rehabilitación en niños con discapacidad en educación temprana

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ABSTRACT. This research deals with the tele-rehabilitation service for children with disabilities in a post-Covid-19 era. There has been a boom with new working models and adaptation to new challenges and experiences of professionals in rehabilitation therapies. With such services as the most effective way to treat psychomotor deficits in children with disabilities, Rehabilitation Centers have reconfigured their planning by offering hybrid care, but there is a lack of integration of ICT for the delivery of these services through agile approaches. Under an Action-Design methodology, a survey was designed and applied to therapists from five Rehabilitation Centers in Mexico; focused on knowing four relevant aspects: Rehabilitation Teleworking; ICT in therapeutic activity; Communication between parents and Rehabilitation centers; and Patients. From the result, it can be inferred that there is a high level of interest at THE initial education in technological training and a need for higher quality stimulation tools and resources.

RESUMEN. Esta investigación trata sobre el servicio de Tele-rehabilitación para niños con discapacidad en una época post-Covid 19. Ha habido un auge con nuevos modelos de trabajo y la adaptación a nuevos retos y experiencias de los profesionales en terapias de rehabilitación. Con dichos servicios como la forma más efectiva de tratar el déficit psicomotor en niños con discapacidad, los Centros de Rehabilitación han reconfigurado su planificación ofreciendo atención híbrida, pero existe una falta de integración de las Tecnologías de la Información y la Comunicación (TIC) para la entrega de estos servicios a través de enfoques ágiles. Bajo una metodología de Diseño-Acción, se diseñó una encuesta aplicada a terapeutas de cinco Centros de Rehabilitación de México. De los resultados se puede inferir un alto interés de la educación a nivel inicial por la formación tecnológica y una necesidad de mayor calidad en las herramientas y recursos de estimulación.

KEYWORDS: Tele-rehabilitation, Psychomotor deficit, Disabilities children, Rehabilitation services, Initial education.

PALABRAS CLAVE: Tele-rehabilitación, Déficit psicomotor, Niños con discapacidad, Servicios de rehabilitación, Educación inicial.

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1. Introduction

The Coronavirus Disease or Covid-19 is an infectious disease caused by the SARS-CoV-2 virus (World Health Organization (WHO), 2022) that causes mild to moderate respiratory illness with symptoms like fever, cough, tiredness, loss of taste or smell. The infection became a pandemic on 2020 year around the February and March months, it led to school closures in most countries around the world, and it interrupted the school attendance of at least 1.5 billion students in 2020 and 2021 (Vincent-Lancrin et al., 2022). Besides schools, the Rehabilitation Centers for children with disabilities were affected too during the Covid-19 process. In many countries, to reduce the risk of contamination, environments, where social participation is ensured were temporarily restricted (Seyhan Biyik, 2021), so both systems have had to adapt to this situation somehow. But, one of the main challenges hindering the wider adaption of telehealth is the lack of interoperability, which according to the Healthcare Information and Management Systems Society (HIMSS), is defined as "the ability of different information systems, devices or applications to connect, in a coordinated manner, within and across organizational boundaries to access, exchange and cooperatively use data amongst stakeholders, with the goal of optimizing the health of individuals and populations" (Tsiouris et al., 2020). In this sense, rehabilitation plays an educational role for these children who need rehabilitation therapy services for their development. This is a crucial part of the later incorporation to an inclusive education that continues helping them potentiate skills. Inclusive education implies that schools should welcome all children, regardless of their physical, intellectual, social, emotional, linguistic, or other conditions.

New methods are developed in which new technologies are employed, and a holistic approach to the patient, requiring the cooperation of specialists in various fields, is assumed (Jakubowska et al., 2019) The scenarios where rehabilitation therapy services are carried out with involved roles like assistants, managers, therapists, psychologists, among others, generate a lot of information. Due to the large number of children cared for the centers and the diverse professional perceptions, the plannings, workloads, and dynamic in the therapy sessions create information order needs for collaborative work and mutual purpose work. So, from a software engineering perspective, the agile development method can best be established by continuous communication between software developers, clinicians, and patients. Furthermore, iteratively adapting the application requirements to user feedback and needs, the development process remains flexible throughout the application's lifecycle (Koenig et al., 2014).

Service therapies are demonstrated as one of the most effective ways to help with symptoms of psychomotor deficits, denoting effectiveness evidence on various therapy services for children with a psychomotor deficit like the Cerebral Palsy (Novak et al., 2013).

In Zacatecas, México, there are more than 97,000 people with some disability, representing 6.6% of the total population compared to the average of 5.1% (Ibarra Núñez, 2016).

Not just at schools the educators have been shown remarkable resilience in trying to compensate the crisis (Vincent-Lancrin et al., 2022) both teachers and therapists had to be better prepared for similar challenges. They have demonstrated leadership, initiative, and an innovative spirit.

This work set a Problem Statement in next section, followed by Literature Review and Related Work in sections III and IV respectively; then it is given a Proposed Solution in section IV with the design of the main survey, and in section V there are Results, section VI with Discussion of the Results and at the end the Conclusions.

2. Problem statement

Since 2020, Covid-19 significantly disrupted rehabilitation and education services such as speech, sensory or physical therapy for children with psychomotor deficit. In this sense, the main problem is related to neuroscience, which shows that each child's brain plasticity processes continue to run with great dynamism thanks to the experience of stimuli with rehabilitation therapies and educational therapies, experiences that

help them get used to daily life with a better quality of life. Although this interruption directly affects children, rehabilitation professionals and parents are undoubtedly also affected in some of the mentioned ways below:

a) There is a lack of knowledge of elements of contemporary approaches with technologies, tools and activities such as therapies that could help their children in brain restoration and motor learning (Sakzewski et al., 2014), next to b) a partial restriction that some institutions still manage (Camden & Silva, 2021) without individualized programs, because c) the resources offered by the new model of Special and Inclusive Distance Education of the Ministry of Public Education (SEP) in Mexico through television or a website are not transmitted with appropriate therapies for each child, only counting with documents such as written manuals, suggested activities or videos with interviews, but not classes guided by therapists to observe positions and maneuver children according to their needs (Secretaría de Educación Pública, 2017b).

So, this detected situation poses that there are limits and technological barriers at the patient, clinical, organizational, and systemic levels that do not allow the implementation of an effective adoption of telehealth for children with mild psychomotor deficit in Mexico (Camden & Silva, 2021).

3. Literature review

Living with a disability stops many opportunities to grow in society in the same way that a healthy person does in professional, work, social and emotional aspects. The earlier a diagnosis is made that indicates a psychomotor deficit in children, the actions to be followed in the most immediate way possible are a set of rehabilitation therapies, so that, the ravages of the disability can, if not be reversed, be significantly reduced, giving necessary abilities for a better quality of life. Monitoring psychomotor development is considered a critical task of control health in infants and preschoolers (Instituto Mexicano del Seguro Social, 2014), since the diagnosis of a psychomotor deficit is primarily due to a neurological damage, and it is observed mainly after the prenatal, postnatal, and childhood periods. By intervening early at the initial age, ranging from 0 to 6 years old, a critical window of opportunity is achieved to attend to psychomotor disorders in children. Psychomotor Deficit (PD) is the clinical manifestation of pathologies of the Central Nervous System (CNS), either due to genetic alterations or environmental factors, which affect the psychomotor development of the child in the first 24 to 36 months of life, which defines developmental progress in a child in motor, language, manipulative, and social areas (Fernández Mayoralas et al., 2015). Characteristics of a child with a psychomotor deficit may include muscle weakness, abnormal muscle tone, decreased range of motion in the joints, and decreased balance and coordination (Michaud, 2004). However, even with severe problems, effective rehabilitation procedures are carried out that contribute to brain plasticity. Brain plasticity is the adaptive capacity of the central nervous system (CNS) to reduce the effects of injuries through changes that modify the structure and function (Márquez Noriego, 2016), making a neuronal reorganization that occurs to try to compensate or restore the lost function. Rehabilitation therapy-type experiences modify neural circuits since they are plastic, and in most cases, the efficiency and number of synaptic connections change (Berardi & Sale, 2019).

As a timely intervention, services such as Initial Education, Early Stimulation, and Child Rehabilitation provide attention to the symptoms that lead to a psychomotor deficit in early childhood children. Initial education is the educational service that is provided to girls and boys from zero to six years old to enhance their comprehensive and harmonious development in an environment of formative, educational and affective experiences, which allows them to acquire skills, habits, values, autonomy, and creativity (Consejo Nacional de Prestación de Servicios para la Atención, 2018). The importance of quality early childhood education is reflected in the Sustainable Development Goals, as target 4.2 calls for access to quality pre-primary education for all children (UNICEF, 2020). In Mexico, Initial Education has followed a lengthy search process to be recognized and valued as part of the educational process (Secretaría de Educación Pública, 2017). This service is applied to children with disabilities in the Multiple Attention Centers, but it must be complemented with rehabilitation therapies and early stimulation appropriate to the psychomotor deficit of each child. With the COVID-19 pandemic, a hybrid modality emerged, where online treatment and contact with therapy professionals and specialized in physical care mixed (van Vugt et al., 2020) and coordinated.

Some Rehabilitation Centers in Zacatecas, Mexico, that offer Infancy Rehabilitation with Early Stimulation and Initial Education have adapted their services to become what is called "Telerehabilitation" as a health service of the Telehealth modality. However, even though telehealth existed, there was a boom in its usage from 2020 until now.

Telerehabilitation can be broadly defined as "the application of information and communication technologies to provide rehabilitation therapy to remote people" (Hosseiniravandi et al., 2020) and especially the home-based rehabilitation (HBR), where Software Engineering, in conjunction with other disciplines, designs systems for different approaches, purposes, and capabilities enhanced with a variety of sensors, virtual reality technologies, robots, and motion detection tools such as Kinect, Lip Motion, Nintendo Wii, among others, also called as Home Based Telerehabilitation (HBTR).

Covid-19 has changed the provision of services for children with disabilities in all settings, resulting in decreased access or complete loss of therapy services because multiple gaps existing in these critical services (Murphy et al., 2021). This lack of knowledge and technological resources to take advantage of telerehabilitation results in deficits that exacerbate the disparities already experienced by these vulnerable children. Service disruption and transition to telehealth for children with developmental disabilities have been prevalent since the pandemic (Zhang et al., 2022).Moreover, even the access to health services in rural and remote areas had been affected worldwide some years before the pandemic. However, the advantages model of telehealth is still inferior in terms of communication efficiency and rapport building between clinicians and clients (Zhang et al., 2022).

The works found in the literature for Telerehabilitation of infancy are vast, and the field is evolving (Arora & Quel De Oliveira, 2022) so this research present here just some relevant studies. These works focus children´s disabilities but not precisely on motor disabilities. Some refer to other disabilities like speech disorder, autism, neurological disease, or a mixed of symptoms that affect a person's psychomotor development. Regardless of the context in which it was applied, emphasizing being conditioned children with specific deficits, we have decided to add them in this work describing the main features in Table 1 below.

Research	Main Characteristics
1.An agile approach to improving the usability of a physical telerehabilitation platform **Authors, Place and Year** (Pilco et al., 2019)	A telerehabilitation platform complemented with the use of intelligent biomedical sensors. The study performs a usability evaluation of a telerehabilitation platform developed and proposed in an iterative process using a digital representation of the patient, which duplicates the therapeutic exercise being executed by the patient detected by a Kinect camera and sensors in real-time. It intends to serve as a guide to improve the usability of e-Health systems in alignment with the software development cycle
2.A vision-based approach for building telecare and telerehabilitation services (Barriga et al., 2016)	The study talks about healthcare since they enable people to remain independent in their homes by providing person-centered technologies to support the individual. Focused on technologies for older people to be assisted in their homes. It shows many exciting proposals to address telerehabilitation and telecare scenarios, categorized into two broad groups, namely wearable devices and context-aware systems. The empirical analysis reveals the effectiveness and accuracy of the algorithms presented in our approach and provides more than promising results when the neural network parameters are appropriately adjusted.
3.A Virtual Reality-Based Cognitive Telerehabilitation system for use in the COVID-19 pandemic (Varela-Aldás et al., 2021)	The COVID-19 pandemic has changed healthcare services, and they will have to adapt to the new situation by increasing the number of services remotely offered, especially those related to cognitive impairments. This is a telerehabilitation approach. Both the patient and the specialist physician enter a virtual reality (VR) environment where they can interact in real-time through avatars. Results showed that it is possible to carry out cognitive rehabilitation processes through a telerehabilitation modality with VR. Furthermore, the system's cost-effectiveness will also contribute to making healthcare systems more efficient, overcoming both geographical and temporal limitations.
4.Telerehabilitation for Improving Adaptive Skills of Children and Young Adults with Multiple Disabilities: a Systematic Review (Capri et al., 2021)	Systematic review of Telerehabilitation (TR) interventions on children and young adults with multiple disabilities (MDs). It examines the effectiveness of Telerehabilitation (TR) on adaptive skills that have been targeted for intervention, describes the type of devices used in the intervention procedures, summarizes the outcomes, and examines the consumer/professional satisfaction of TR. Results suggested that TR is an effective tool in improving the adaptive skills of children and young adults with MDs.

Table 1. Related works on infancy telerehabilitation. Source: Self-made.

The mentioned works of table 1 could focus not only on children but people in general, adults and the elderly as a population that, if it suffers from a disability, also finds it necessary resort to receiving care remotely if the circumstances do not allow it to be face-to-face. It is essential to mention that "all children with disabilities have the right to enjoy the highest health possible level, and have access to medical services and rehabilitation, with special emphasis on those related to attention primary health" (UNICEF, 2006), even when health resources in our country are insufficient. In this sense, this research work appeals and tries to contribute to the Sustainable Development Goals (SDGs) adopted by United Nations Members in the Health and Wellbeing as Goal 3 and Quality Education as Goal 4 according to the pledge of fast-track progress for those furthest behind first (United Nations Development Programme, 2022) being strongly related in achieve access to quality essential health-care services and to ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities.

4. Methodology

It was followed an Action Design Research methodology; it generates prescriptive design knowledge through building and evaluating ensemble IT artifacts in an organizational setting (Sein et al., 2011) Their process model identifies a four-stage approach: (1) Diagnosis; (2) Design; (3) Implementation; and (4) Evolution (Mullarkey & Hevner, 2019). The methodology aims at three critical objectives. The first is to know the context and general characteristics of the children´s therapy services that prevailed after Covid-19. The second objective consists of adapting a survey to delve into the challenges faced by the main actors of the environment. Moreover, the third objective was to analyze the findings to propose some collaborative technological tools that support the management processes of the children´s therapy services. The survey was carried out in February and March months of 2022 and applied to professionals working in Rehabilitation Centers of Zacatecas city.

4.1. Participants

The participants were made up of a group of 28 rehabilitation professionals among it includes therapists, psychologists specializing in early stimulation, and special education teachers of five Rehabilitation Centers in the city of Zacatecas in Mexico:

- Asociación Pro Paralítico Cerebral A.C.
- Centro de Atención Múltiple No. 30 "Roberto Solís Quiroga"
- USAER from Education Secretary, Zacatecas city
- Bambú Centro de Desarrollo Integral Infantil
- DIBIDI Centro de Estimulación Temprana

These Rehabilitation Centers attend around 150 to 200 children between 0 to 6 years old from the city of Zacatecas, México, with diverse diagnostics among which stand out sensorial, motor, speech, and cognitive problems; cerebral palsy; neuromuscular diseases; neurodevelopmental delays; intellectual disabilities; and head injuries to mention some inside the psychomotor deficit symptom.

4.2. Survey design

Current survey design follows a rehabilitation therapeutic telework approach. Therefore, the challenges, in this case, represent the constructs of the survey to obtain relevant information about the studied environment. These four constructs have been called: 1) Rehabilitation telework, 2) ICT usage in therapeutic activity, 3) Communication between Rehabilitation Centers and Parents, and 4) Patients. So, Table 2 explains what these constructs refer to.

Construct	Description
C1.Rehabilitation telework	This concept refers to Telerehabilitation. The most common term used when rehabilitation professionals interact with patients at a distance, through information and communication technologies, to provide rehabilitation services (Russell, 2007). The technology used by rehabilitation professionals can be diverse, ranging from simple day-to-day applications (e.g., contact via phone calls or by e-mail) to complex technologies (e.g., specialized equipment) (Camden et al., 2020) implementing best practices when the focus of the therapies is on supporting the children with disabilities and their families.
C2.ICT in therapeutic activity	Increased use of ICT might benefit children and youths with physical disabilities because of their potential to increase independence when performing activities and provide opportunities for social interaction (Lidström et al., 2011). For example, videoconferencing provides consultation, diagnostic assessments, treatment interventions delivery and verbal and visual interaction between the therapist and the client (Arora & Quel De Oliveira, 2022) Many cognitive, speech, physical, or occupational therapies are examples of ICT impact on this service delivery.
C3.Communication between rehabilitation centers and parents	Parent attendance, participation, and engagement are necessary components of children's developmental rehabilitation therapy (children's therapy), including physical therapy, occupational therapy, and speech-language therapy services (Phoenix et al., 2019). So, this construct is essential to know how it maintains close communication among parents and professionals of the rehab centers.
C4. Patients	In this construct, patients are children with a psychomotor deficit, which characteristics may include muscle weakness, abnormal muscle tone, decreased range of motion of the joints, and decreased balance and coordination (Michaud, 2004b), also qualified like neuromotor children due to the deficits they suffer at the brain level.

Table 2. Description of constructs. Source: Self-made.

The number of questions that compose the survey is 31, where a number of 22 were coded on a Likert scale. First, the instrument was validated using Cronbach's Alpha coefficient. This measure of reliability assumes that the items (measured on a Likert-type scale) measure the same construct and are highly correlated (Groeneveld et al., 2015). Table 3 shows the coefficients for each section and the question totals for the entire survey.

The survey instrument demonstrates internal consistency between the items analyzed and their constructs. For example, t final value in the last line of Table 3 is an acceptable Cronbach´s Alpha above 0.7 (George & Mallery, 2010).

Construct	Items	Cronbach´s Alpha
C1.Rehabilitation telework	17	0.76
C2.ICT in therapeutic activity	34	0.91
C3.Communication between rehabilitation centers and parents	6	0.81
C4. Patients	7	0.74
TOTAL	**64**	**0.81**

Table 3. Constructs of the survey in the present work. Source: Self-made.

Furthermore, it is also considered very good because it is above 0.8. The results obtained for each section of the survey are interpreted below, including the significant statistical correlation items.

5. Results

This section shows the results of applying an online version of the survey to the participating rehabilitation professionals (described in section V) carried out between February and March months of 2022.

5.1. Telework rehabilitation

Firstly, the results include that 40% belong to private Rehabilitation Centers of the total of the participants, while 60% do in Public Rehabilitation Centers. Furthermore, 92.3% of the participating rehabilitation professionals had performed telework to deliver rehabilitation therapy services to children and families because of the Covid-19 contingency and after it. Also, 84.6% of them had never worked with this modality before the pandemic, showing that a lack of digital and technological skills exists in both public and private organizations

in this field of services. Added to this, figure 1 shows the question "In which place do you perform the remote work?" a result, 76.9% do it at home, 23.1% from the Rehabilitation Center, and equal percentages of 3.8% do it in the office, schools, or a mix between school and home. On the other hand, the technological equipment to do a remote work received several qualifications, see figure 2: "How do you rate the technological equipment you have to work remotely" (Innovative 7.7%, Enough 34.6%, Necessary 34.6%, Outdated 15.4%, Obsolete 7.7%) and this is due in large part to the fact that the organization does not count with the means to support in this regard to their collaborators outside. So, every person has solved with their resources, and although a majority believes that the equipment is sufficient to carry out remote work, it is vital to consider those who have outdate and obsolete equipment.

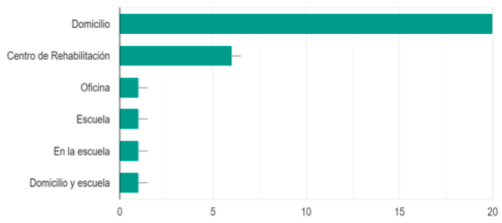

Figure 1. In which place do you perform the remote work of rehabilitation?. Source: Self-made.

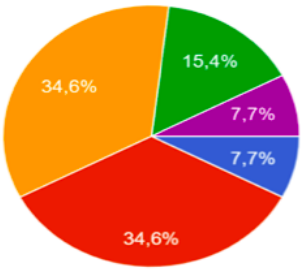

Figure 2. How do you rate the technological equipment you have to work remotely?. Source: Self-made.

5.2. ICT usage in the Rehabilitation Services

In this construct, the aspect of the most used technological tools for communication between therapists and parents is shown in Figure 3 with the question "From the technological platforms, which of them do you use to communicate with family´s children" the most mentioned was "WhatsApp" with 84.6% always used; followed by Zoom with 34.6% frequently used; Google Meet, with26.9% frequently used; Telegram 19.2% frequently used, or e-mail 19.2% always used; and after that social media like Facebook or Chat messenger was mentioned; but Telegram, e-mail, chat messenger, and educative platforms figure too as tools never used with a low percentage.

Relevant information of this construct was that all the population that answered the survey considered it necessary that special training courses in the use of ICT must be offered, as figure 4 shows, which demonstrates again the perception of lack of digital competencies, but also the need to expand knowledge with the support of technology. Among the new ICT proposed on training courses to know and learn, the five preferred ones were Use of Educational platforms with 88.46%; Educational mobile apps with 69.23%, Collaborative Environments Platforms and Informatic Security with 65.38%, Use of Simulators and Basic Elements of the Computers with 61.53%; and Team Management Platforms with 57.69%.

A total of 65.4% would like to have consultants in ICT use to support the infancy therapeutic activity derived from the COVID-19 post contingency.

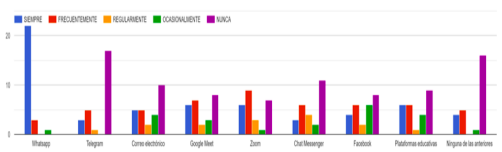

Figure 3. From the list of technologic platforms, which of them you use to communicate with family´s children?. Source: Self-made.

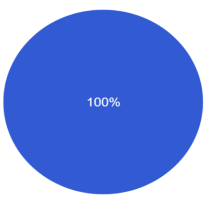

Figure 4. ¿Do you consider it necessary to offer that special training courses in the use of ICT for therapists and teachers?. Source: Self-made.

Aguilar-Carlos, M. L.; Muñoz-Arteaga, J.; Muñoz-Zavala, A. E.; López-Torres, G. C. (2023). Challenges of tele-rehabilitation in children with disabilities in initial education. *Campus Virtuales,* 12(1), 133-144. https://doi.org/10.54988/cv.2023.1.1136

5.3. Communication between Rehabilitation Center and parents

Effective communication in this context, where the children don´t speak or express themselves, is required to continue achieving the desired development objectives. In the question "Do you think that parents dedicate the time to support the rehabilitation and learning of their children" (see figure 5), (7.7% Always; 19.2% Frequently; 46.2% Regularly; 26.9% Occasionally; 0% Never) the prevailing perception among child rehabilitation professionals is that Regularly, the parents dedicate the time to support their children in the rehabilitation from home, with 46.2% and only 7.7% think that this happened Always. Sometimes, it is due to ignorance from parents, lack of time because of work and housework; or not being motivated for the high responsibility already charged with a child with a disability, among many other issues. Nevertheless, with the mediation of ICT tools, sometimes parents do not have experience or interest in learning to teach or support their children. For example, it is shown in figure 6 with the question, "Do you think that parents have experience in the use of ICTs supporting their children's learning and rehabilitation at home?" (Always 3.8%; Frequently 19.2%; Regularly 34.6%; Occasionally 38.5% and Never 3.8%).

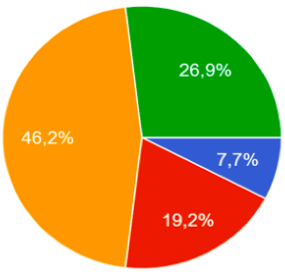

Figure 5. Do you think that parents dedicate the time to support the rehabilitation and learning of their children?. Source: Self-made.

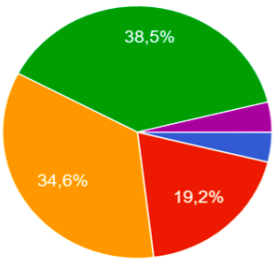

Figure 6. Do you think that parents have experience using ICTs to support their children's learning and rehabilitation at home?. Source: Self-made.

5.4. Patients

The construct of Patients focuses on children with neurodevelopmental issues that cause certain psychomotor deficits that make them be conditioned on motor skills that require the support of their parents or caregivers most of the time. With these limitations, the dynamic work changes children´s participation. Figure 7 with the question: "Do you consider that there has been stagnation in children with neuromotor conditions or even a setback due to the distance modality? The highest percentage of participants think that frequently these children suffer stagnation or a setback due to the distance modality, representing 46.2% (Always 19.2%; Frequently 46.2%; Regularly 19.2%; Occasionally 15.4%; Never 0%). This means that many factors influence low participation when the work has to be done remotely, and it has to be analyzed the best practices to work with Telerehabilitation for effectiveness for families and children. Added to this, in the question "Do you use any application (software), platform (virtual space), or website to support remote rehabilitation of patients with neuromotor conditions in Figure 8, (Always 19.2%; Frequently 19.2%; Regularly 23.1%; Occasionally 3.8%; Never 34.6%) we can observe that the majority with 34.6% has never use technologies like applications, platforms, or website to provide the rehabilitation therapies services.

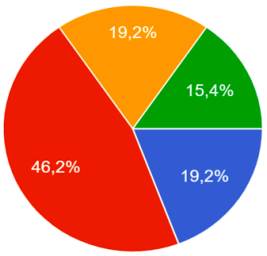

Figure 7. Do you consider that in children with neuromotor condition there has been a stagnation or even a setback due to the distance modality?. Source: Self-made.

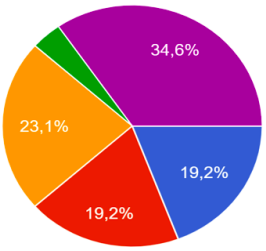

Figure 8. Do you use any application (software), platform (virtual space) or website to support remote rehabilitation of patients with neuromotor conditions?. Source: Self-made.

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6. Discussion of results

The present study exposes the relation between telerehabilitation modality and its real utilization in Rehabilitation Centers of Zacatecas, Mexico. When the ultimate challenge in telerehabilitation is clearly to achieve location-independent, integrated therapeutic intervention at a distance, or teletherapy (Winters, 2002), the purpose has been to explain the findings of an applied survey results. Rehabilitation services and providers, as occupational and physical therapists have been challenged by the pandemic. Some rehabilitation sectors have been highlighted (such as in patient respiratory physical therapy), but other sectors have experienced a lowering of demand (Jesus et al., 2020), mainly due to fear to suffer a contagion, particularly for outpatient or home-based rehabilitation. Many rehabilitation professionals need to develop, within a short period of time, the knowledge, and skills to deliver care through telehealth technology with quality and safety requirements (Jesus et al., 2020), something which is demonstrated with survey results that almost all the professionals that deliver this kind of service lack digital skills with the use of virtual meeting platforms or other software programs.

Unfortunately, telework has several challenges, such as lack of motivation to work, and issues with ergonomics (Moradi et al., 2021). Some children's rehabilitation centers continue with a hybrid work, especially for those patients who live in very remote places or whose health condition prevents them from traveling frequently. However, the technological equipment is not always in the best state to provide efficiency and velocity, influencing a poor service experience. In this same sense, WhatsApp was the social network most used as a communication channel between rehabilitation professionals and administration staff of the Rehabilitation Center with the families of children as the survey results shows in this research. It is because of its great popularity and ignorance of other tools and applications. Tools such as real-time meeting platforms that can give a more personalized service make us detect and bear the same results about the lack of specialized courses in computer technologies that can be adapted to their areas of work. Among the required training for Infancy Rehabilitation, the highlights that we believe are consistent with the objectives were Educational Platforms and Mobile Apps, Collaborative Environment Platforms, and Team Management Platforms. A first step could be the generation of virtual therapy resources such as pre-recorded videos, categorized digital guides, and immersive experiences. Furthermore, an analysis is necessary for this modality of Rehab Teleworking, arguing about a higher training in both services and infrastructure with new devices that support the therapy sessions.

The construct of Communication between Rehabilitation Centers and Parents made us notice that there is a lack of time on the part of the parents for the complete attention of their children, cooperating with the follow-up of therapies from home from the point of view of therapists. So, if they consider inexperienced by the parents or caregivers, it is essential to create plans for collaboration considering the support network that they as professionals represent.

The children with neuromotor deficits were significantly affected by the Covid-19 pandemic. Unfortunately, for special education therapists and teachers, remote work did not represent significative progress but rather delays, coupled with little knowledge in the use of information and communication technologies. So, it is urgent to enrich the telerehabilitation modality with more government, social and technological support.

7. Conclusions

The adaptation of infancy rehabilitation with the support of technologies is still in analysis but has an intense urgency in concrete actions that improve this critical service. The fields that include the match among Telerehabilitation with a post Covid-19 scenery in the world are precise methodologies that guide professionals on tasks as alternatives for those who prefer a remote service. Moreover, it is achieved with cohesive communication between children´s parents, because, despite their great potential, the transition of telehealth systems from proof-of-concept applications at research-level, into actual real-life healthcare solutions has been rather lacklustre (Tsiouris et al., 2020).

There are specific technological support platforms whose objective is to support team management, such as Jira (Jira | Issue & Project Tracking Software | Atlassian, n.d.), Asana (Asana, El Software Para Gestión de Proyectos. Los Equipos No Pierden de Vista El Trabajo Gracias a Asana. • Asana, n.d.), Miro (Una Plataforma Colaborativa Visual Online Para Trabajar En Equipo | Miro, n.d.), or Trello (Trello, n.d.), which allow tasks to be assigned to several collaborators in a work team, stipulating delivery times and values in the activities, in order that a work process is fulfilled on time and to visualize significative advances in children psychomotor development, which can be reflected in a more representative way.

As the most used tool, WhatsApp does not offer as many evaluations or collaborative work options like other new team management platforms mentioned before, so more pilot studies must be implemented on to show the effectiveness in rehabilitation teams.

Also, other technologies with Virtual Reality and Augmented Reality could be integrated, for the purpose of contributing to advances in telehealth children rehabilitation in three necessary contexts: home-based rehabilitation, hybrid rehabilitation (contemplating rehabilitation center and home), and a rehabilitation content repository.

An analysis of the most appropriate architecture and necessary components is a future work since the results in this research survey demonstrates there are issues with awareness, empathy, team management, and motivation until government support is more focused on home support staff due to the lack of time and resources for many families who are parents of a child with neuromotor disability.

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