



Teleneuropsychology during the COVID-19 pandemic in Mexico: the perspective from a middle-income country

Ana Natalia Seubert-Ravelo, Carlos Alberto Serrano-Juárez, José-Ángel Cabañas-Tinajero, Fátima Aideé González-Gutiérrez, Julieta Moreno-Villagómez, Belén Prieto-Corona, Carolina Reyes-Méndez, Marybeth Téllez-Rodríguez & Ma Guillermina Yáñez-Téllez

To cite this article: Ana Natalia Seubert-Ravelo, Carlos Alberto Serrano-Juárez, José-Ángel Cabañas-Tinajero, Fátima Aideé González-Gutiérrez, Julieta Moreno-Villagómez, Belén Prieto-Corona, Carolina Reyes-Méndez, Marybeth Téllez-Rodríguez & Ma Guillermina Yáñez-Téllez (2023): Teleneuropsychology during the COVID-19 pandemic in Mexico: the perspective from a middle-income country, Journal of Clinical and Experimental Neuropsychology, DOI: [10.1080/13803395.2023.2189229](https://doi.org/10.1080/13803395.2023.2189229)

To link to this article: <https://doi.org/10.1080/13803395.2023.2189229>



Published online: 13 Mar 2023.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)



Teleneuropsychology during the COVID-19 pandemic in Mexico: the perspective from a middle-income country

Ana Natalia Seubert-Ravelo, Carlos Alberto Serrano-Juárez, José-Ángel Cabañas-Tinajero, Fátima Aideé González-Gutiérrez, Julieta Moreno-Villagómez, Belén Prieto-Corona, Carolina Reyes-Méndez, Marybeth Téllez-Rodríguez and Ma Guillermina Yáñez-Téllez

Clinical Neuropsychology Residency Program, Research and Postgraduate Division, Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, Tlalnepantla, México

ABSTRACT

Introduction: The use of teleneuropsychology (TeleNP) increased as a result of the COVID-19 pandemic; however, there have been no studies of the benefits and difficulties with this modality in middle-income countries. This study aimed to assess the current use of TeleNP in Mexico.

Method: Mexican neuropsychologists were invited to participate in an online survey regarding the use of TeleNP during the COVID-19 pandemic. The survey was based on issues from a literature review and consisted of 36 questions requiring yes/no, multiple choice, or ordinal answers. The survey was created using Google Forms and asked respondents to provide informed consent. A total of 107 clinical neuropsychologists completed the survey.

Results: 82% of participants currently use TeleNP, and most reported learning about TeleNP through personal experience, literature research, and colleagues. Brief evaluations, delivery of results, and intervention were the principal services provided, most frequently on a home-to-home basis. Almost 30% of clinicians reported not requiring informed consent for use of the modality. Consultations included children, adolescents, and adults in similar numbers; older adults were less frequent. Technological limitations were the most frequent reason for ruling out the modality with particular patients. Perceived benefits included the ability to continue consultations despite social distancing measures, lesser risk of COVID-19 infection, and the possibility of seeing patients with limited access to neuropsychological services. Reasons for not using TeleNP included a lack of standardized instruments, not feeling comfortable with the modality, and lack of technological resources and skills.

Conclusions: Despite the socioeconomic differences between Mexico and high-income countries, most of our findings were similar to reports from those countries. However, technological limitations were common, and smartphones were commonly used, contrary to recommendations in the literature. The future use of TeleNP in Mexico should include formal training and ethical guidelines.

ARTICLE HISTORY

Received 14 December 2022
Accepted 04 March 2023

KEYWORDS



Telemedicine;
neuropsychological tests;
COVID-19; health care
surveys; videoconferencing;
Mexico

Introduction

Teleneuropsychology (TeleNP) refers to the use of audio-visual technologies to provide remote neuropsychological services (Bilder et al., 2020; Rochette et al., 2021), including clinical assessment, interviews, testing, intervention, reviews of medical records, feedback sessions, psychoeducation, and educational consultation (Bilder et al., 2020; Hewitt et al., 2020; Koterba et al., 2020; Parlar et al., 2020). This practice was relatively infrequent until a few years ago (Brearly et al., 2017; Chapman et al., 2020; Hammers et al., 2020), but its application rapidly increased worldwide with the outbreak of the COVID-19 pandemic and accompanying social restrictions (Chapman et al., 2020; Guidotti Breting et al., 2020; Hammers et al., 2020). A substantial proportion of

neuropsychologists have expressed an intention to continue using TeleNP after the pandemic (Hammers et al., 2020). Mexico has been no exception to this phenomenon, but the specific characteristics of TeleNP use in this country have not been explored.

Concerns have been raised about the validity and reliability of TeleNP, since it involves modification of standardized procedures, potential loss of information, limitations in conducting certain tests, and lack of control over material created by the patient (Appleman et al., 2021; Marra, Hamlet et al., 2020; Parlar et al., 2020). TeleNP assessment may not permit a comprehensive evaluation of all cognitive domains (Hewitt et al., 2020; Parlar et al., 2020), and it may be more difficult to accurately observe qualitative aspects

CONTACT Carlos Alberto Serrano-Juárez  serranojcarlosa@comunidad.unam.mx  Clinical Neuropsychology Residency Program, Research and Postgraduate Division, Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, Av. De los Barrios #1, Los Reyes Iztacala, Tlalnepantla de Baz, Edo. de México, Tlalnepantla, México

© 2023 Informa UK Limited, trading as Taylor & Francis Group

of a patient's performance during test administration using a camera than in person (Pérez et al., 2021). However, a growing number of studies provide support for TeleNP assessment, with evidence for the equivalence of various cognitive measures in remote versus conventional face-to-face administration (Brearly et al., 2017; Marra, Hoelzle et al., 2020; Rochette et al., 2021), for adequate to marginal test-retest reliability on some tasks (Fox-Fuller, Ngo et al., 2022), and for the ability to distinguish between clinical and non-clinical populations (Parks et al., 2021).

TeleNP implementation requires specific technological and environmental conditions: an appropriate platform, a computer with a camera and microphone of acceptable quality, a stable internet connection, and a distraction-free environment (Bloch et al., 2021; Hewitt et al., 2020; Koterba et al., 2020). Even high-income countries report difficulties with these technological conditions, most frequently failures in internet connectivity, environmental distractions in the examinee's setting, and an examinee's limited access to technology (Fox-Fuller, Rizer et al., 2022).

Although TeleNP is not intended to displace traditional practices, it represents a useful option in some cases for providing neuropsychological services, and it could continue to be a viable delivery format in general practice in the long term, in circumstances such as catastrophes, or for patients with health problems, who live in remote areas (Parlar et al., 2020; Pérez et al., 2021), who have physical disabilities (Pérez et al., 2021; Yeroushalmi et al., 2020), or who have infectious diseases that require contact restrictions (Parlar et al., 2020).

Given that TeleNP use might vary widely depending on economic, political, social, technological, and educational factors (Sullivan-Baca et al., 2022), it is important to make specific recommendations about its implementation in different places, particularly in countries like Mexico, which have different health infrastructure and demographic and technological characteristics than the high-income countries where its use has been studied.

This study aimed to understand the current state of TeleNP use in Mexico, specifically the number of neuropsychologists who use it, the technical, methodological, and clinical characteristics of their use, as well as its perceived challenges, limitations, and benefits, including reasons for not using it and perspectives on its future use. The results provide an idea of the similarities and differences in the use of TeleNP in a middle-income country, as compared with the high-income countries where most studies have been carried out. It also offers

perspectives on the challenges and limitations of TeleNP for use beyond the COVID-19 pandemic.

The descriptive hypothesis of this paper is that the use of TeleNP in Mexico for assessment, diagnosis, and intervention increased during the COVID-19 lockdown, and that major technological problems in its use could be analyzed in future research.

Materials and methods

Procedure and participants

Members of the Mexican Neuropsychological Association (AMN) were invited by e-mail to participate in a survey regarding the use of TeleNP during the COVID-19 pandemic. A snowball sampling method was used to invite other clinical neuropsychologists residing in Mexico to participate in the study. The survey (reprinted in the Appendix) was based on a literature review of recent studies of TeleNP-related surveys and incorporated the experience of the research group with the use of TeleNP during the previous two years. Prior to the dissemination of the survey, all of the authors thoroughly reviewed the questions and answer options and responded to the survey themselves to verify its proper functioning without technical difficulties. The survey consisted of 36 questions requiring either yes/no, multiple choice, or ordinal answers directed at gathering information on the following general topics: demographic and educational information, training in and use of TeleNP, technical, methodological, and clinical characteristics of TeleNP use, challenges and limitations in the use of TeleNP, degree of satisfaction with TeleNP, reasons for not using TeleNP, and future perspectives. The study was reviewed and approved by the Ethics Committee of the Facultad de Estudios Superiores Iztacala (FES-I), Universidad Nacional Autónoma de México (UNAM). The research followed the principles of the Helsinki Declaration. The survey was created using Google Forms and began with a request for respondents' informed consent. The informed consent explained that the survey information would be used only by the project researchers and not for any other purpose. To protect respondents' identities, they were assigned numbers to use instead of their names. The data were stored on a hard drive and are accessible by password to which only the corresponding author (CASJ) has access. All respondents provided consent for the data collected to be used for research to be presented in scientific forums and journals.

Participants were invited by e-mail, WhatsApp, or direct messages on different social media platforms and were also asked to invite other colleagues to complete the

survey. Only participants who agreed to participate in the study were given access to the survey questions. The survey was open from March 16 to 6 April 2022. A total of 107 clinical neuropsychologists provided informed consent and completed the survey. Participants were health and education professionals with specialization, master's, or doctoral training in clinical neuropsychology, with an active practice and residing in Mexico.

Data analysis

Data were analyzed using IBM SPSS Version 25. Descriptive statistics are provided below for all the items in the survey.

Results

Demographic and education-related characteristics

A total of 107 clinical neuropsychologists completed the survey, of whom 82% answered all 36 items and 18% provided only demographic data, educational information, and reasons for not using TeleNP. Table 1 shows the demographic and educational characteristics of the sample. The age of participants ranged from 24 to 73 years. Most participants, 96%, had undergraduate studies in psychology, with 3% in medicine and 1% in special education. All except three had master's and/or doctoral level training in clinical neuropsychology or behavioral neuroscience. Neuropsychologists from 14 of the 32 states of Mexico answered the survey, a majority residing in Mexico City (45%) and Estado de México (18%), followed by Morelos and Querétaro (6% each), Michoacán and Hidalgo (5% each), and Yucatán and Nuevo León (4% each).

Frequency of TeleNP use and training

Of the survey respondents, 82% reported having used TeleNP, 3% before the COVID-19 pandemic, 8% before

but increasing its use from the onset of the pandemic, and 71% only since its onset. Most TeleNP users reported learning about its implementation through personal experience, literature research, and from their colleagues; receiving training through courses, webinars, and conferences was less common (Figure 1).

Technical, methodological, and clinical characteristics of TeleNP use

The most common neuropsychological services provided through TeleNP (Figure 2) included patient and informant interviews, different types of brief assessments (interviews and cognitive screening, MoCA test, Nasreddine et al., 2005; or behavior questionnaires, SENA, Fernández-Pinto et al., 2015), delivery of results, and different types of intervention and psychoeducation. Full neuropsychological assessments via TeleNP were carried out by less than half of the TeleNP users surveyed (Figure 2a). Most respondents reported performing TeleNP on a home-to-home (88%) or a clinic-to-home (65%) basis, and only 7% from clinic to clinic. Similar proportions reported seeing children (68%), adolescents (66%), and adults (74%) with TeleNP, and smaller numbers saw older adults (41%). Interestingly, 45% of TeleNP users reported increasing the average number of patients seen each week since the onset of the COVID pandemic, and only 24% reported a decrease. The nature of the services provided and the most common conditions addressed through TeleNP are shown in Figure 2b. Types of services provided and most common conditions attended by TeleNP. (a) Types of services provided by TeleNP. (b) Types of patients attended by TeleNP.

Most TeleNP users (71%) reported requesting informed consent from their patients. The technical, environmental, and clinical and personal characteristics most commonly required for TeleNP services are summarized in Table 2. TeleNP users reported that on average, 31% of their patients (range: 0–90%) were not

Table 1. Characteristics of survey respondents.

	Total (<i>n</i> = 107)	TeleNP Users (<i>n</i> = 88)	TeleNP Non-users (<i>n</i> = 19)
Age, years <i>M</i> (<i>SD</i>)	35 (7.99)	35 (7.73)	36 (9.25)
Sex, female (%)	68	69	63
NP Education (%)			
Certificate programs	18	17	21
Specialization	8	8	5
Master's degree	95	97	90
PhD	21	22	16
Practice Setting (%)			
Private practice	83	84	79
Public Hospital	17	17	17
School	27	25	33
Research institution	24	25	17
University clinic	11	11	11

Note. Percentages represent the proportion of a given characteristic within the total sample or within each subgroup.

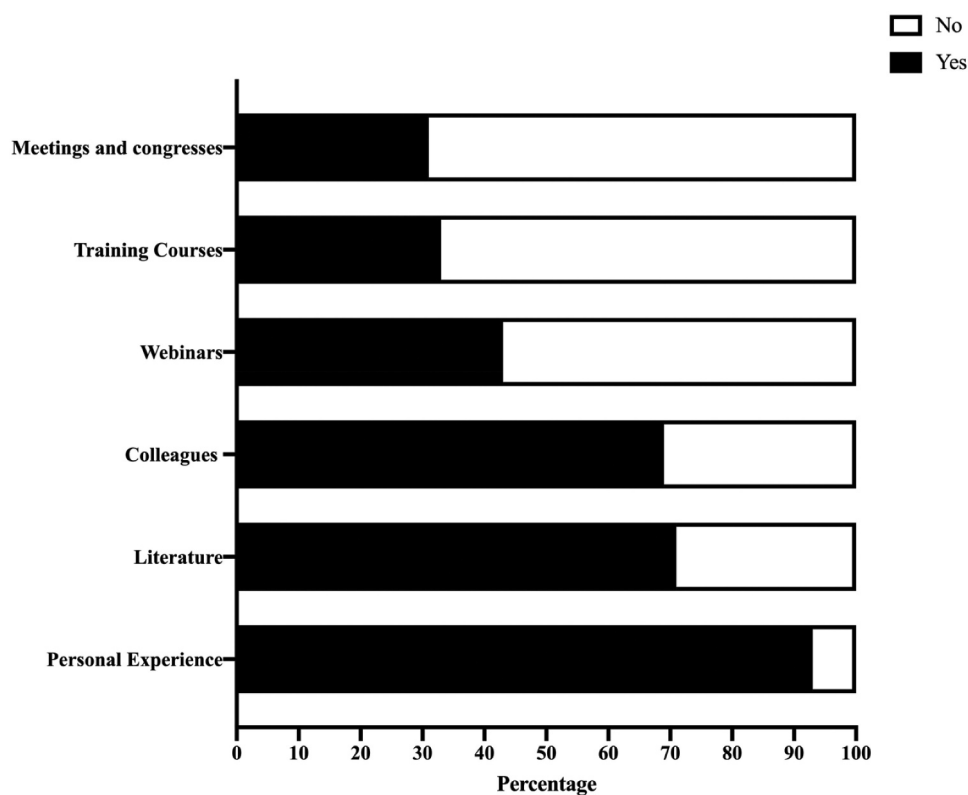


Figure 1. Learning sources for TeleNP implementation.

deemed suitable for TeleNP. Most respondents reported technological limitations as a reason for ruling out the use of TeleNP in specific cases, particularly where patients did not have an adequate telecommunication device or internet connection. Less commonly, they reported clinical characteristics of individual patients as a reason for not using TeleNP.

Respondents reported using a wide variety of platforms for the provision of TeleNP services, with 91% reporting the use of more than one platform. By far, the most used platform was Zoom® (99% of users), followed by Google Meet® (58%), WhatsApp® (57%), telephone call (42%), and Skype® (19%). Less than 15% reported ever utilizing FaceTime®, Google Hangouts®, Microsoft Teams®, Webex Meet®, or Telegram®. Among the providers of TeleNP services, 93% reported the use of a laptop or desktop computer, 55% a smartphone, and 27% a tablet or telephone, respectively. However, they reported that 93% of their patients used a laptop or desktop computer to receive services, followed by a smartphone (74%), a tablet (72%), or a telephone (31%).

Adaptations of assessment instruments or protocols commonly used by TeleNP users in our survey are described in Table 3. Most respondents reported needing more sessions to complete an assessment (57%), although the session duration was the same (61%) as with in-person assessment. Of the respondents using TeleNP,

47% reported needing more sessions than in person, while 35% reported using the same number of sessions.

Perceived challenges, limitations, and benefits of TeleNP

Importantly, 64% of TeleNP users reported having less diagnostic certainty when performing remote assessments than with traditional in-person assessments, and 71% reported believing that interventions administered via TeleNP yielded limited results. Most of the difficulties or limitations reported in the use of TeleNP are described in Table 4. TeleNP users also reported less comfort (56%) in providing TeleNP services than with in-person services. They also report ease (57%) and satisfaction (65%) in the use of TeleNP. Respondents reported various benefits of using TeleNP: the ability to continue with their practice despite social distancing measures (98%), decreased health risk (91%), adding to their knowledge and ability with information and communication technologies (88%), the possibility of providing care to populations that would usually have limited access to neuropsychological services (83%), learning different methods of assessment (83%), and having more time to perform other activities, including leisure (67%).

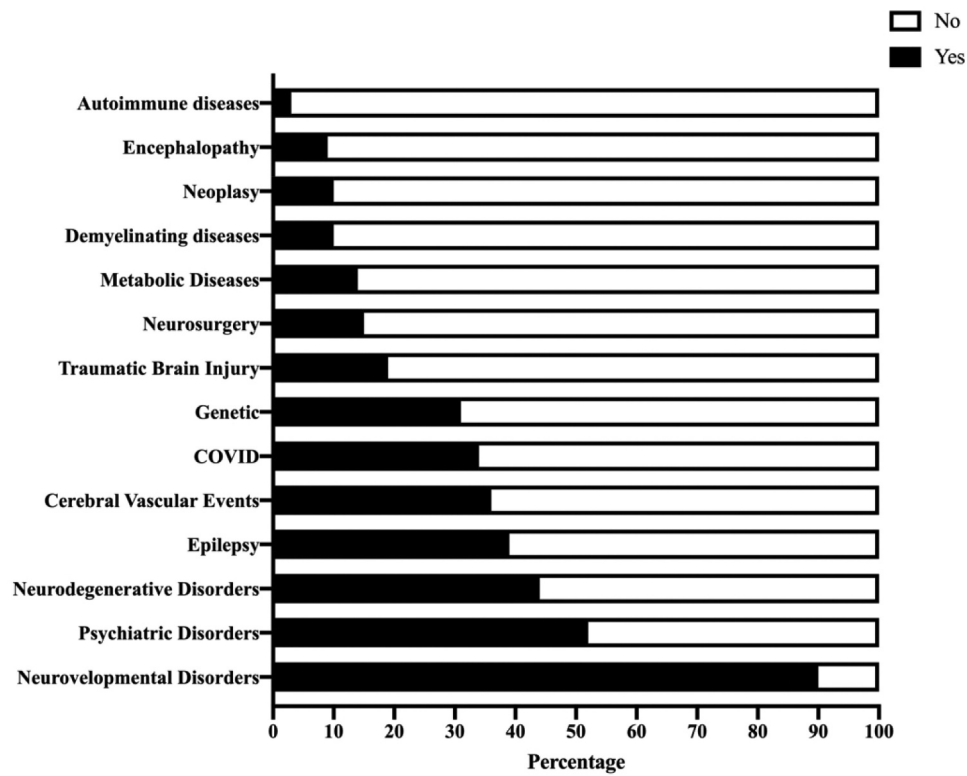
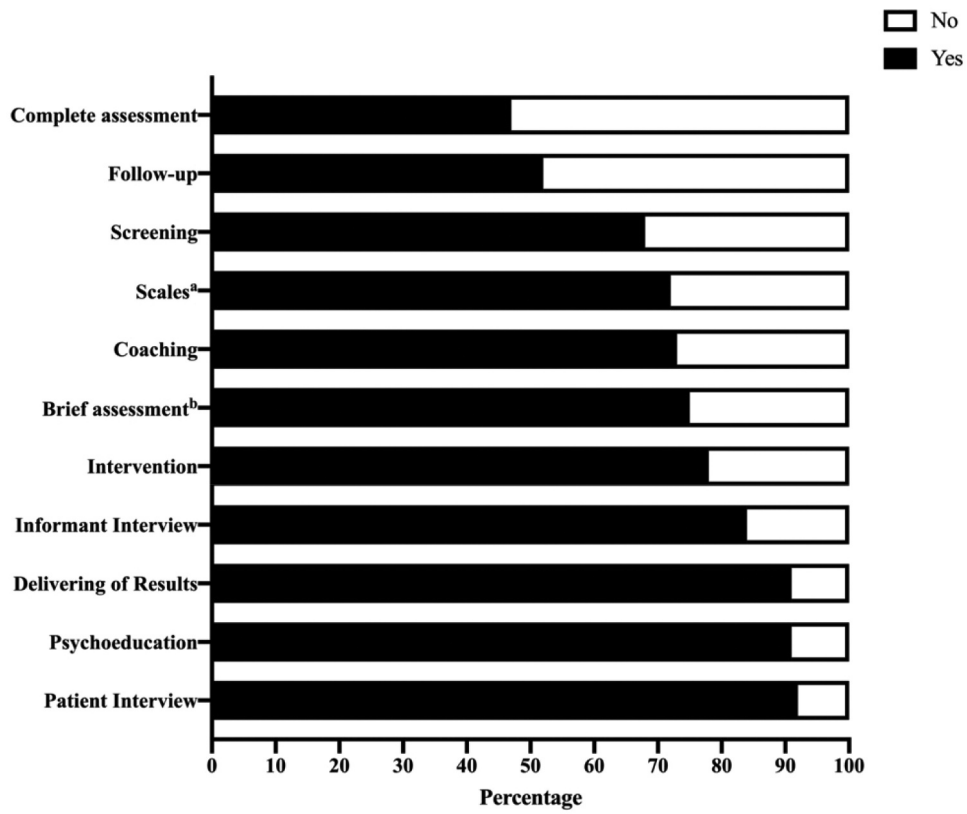


Figure 2. Types of services provided and most common conditions attended by TeleNP.(a) Types of services provided by TeleNP.(b) Types of patients attended by TeleNP.

Table 2. Technical, environmental, and clinical/personal characteristics required for the use of TeleNP and reasons for ruling out its use.

Characteristics Required	Yes (%)	Reasons for Ruling Out	Yes (%)
		<i>Technical</i>	
Stable internet connection	97	Not having a laptop, computer, tablet, or smartphone	75
Adequate audio and video quality	94	No internet connection	64
Laptop or computer	94	Lack of knowledge in the use of technological resources	33
Sufficient language/communication abilities	81		
Third-party support	79		
		<i>Environmental</i>	
No severe sensory/motor deficit	79	Lack of distraction-free environment	34
		<i>Clinical/personal</i>	
Distraction-free environment	78	Insufficient language skills	50
Proper rule-following ability	78	Age (too young/old)	48
Minimum age	76	Severe sensory/motor deficit	48
No severe attentional deficit	71	Severe attentional deficit	48
Smartphone	66	Not following rules properly	44
Tablet	64	No support from a third person	35

Note. Percentages represent the number of TeleNP users who chose each response to the question "Which technical/environmental/personal characteristics must your patients have to receive TeleNP services?" and "Select the reasons for which you have ruled patients out for the use of TeleNP services."

Table 3. Main adaptations made by teleNP users to the tests/assessment protocols.

Adaptations to tests/protocols	Yes (%)
Scanned or photographed stimuli	84
Eliminated subtest not suitable for on-line assessment	74
Requested material to be printed by patients/caregivers	71
Asked the patient to write on shared screen	51
Increased response time limit	35

Note. Percentages represent the number of participants who chose each response to the question "Which adaptations have you performed on tests/protocols for use in TeleNP?"

Reasons for not using TeleNP and future perspectives

Of a total of 19 TeleNP non-users, 14 (74%) reported the lack of standardized and validated instruments for online use as a reason for not using it, 13 (67%) lack of information, 11 (58%) not feeling comfortable providing TeleNP services, 8 (42%) a lack of TeleNP-related

research, 8 (42%) a lack of sufficient mastery of technological tools, 6 (32%) a lack of technological resources, 6 (32%) considered TeleNP assessment or intervention not to be valid, but 16 (83%) of non-users said that they do consider using TeleNP in the future.

Finally, 91% of TeleNP users in our survey reported that they will continue to provide TeleNP services in combination with in-person services, 4.5% that they will continue providing only online services, and 4.5% that they will not provide further TeleNP services.

Discussion

In 2020, COVID-19 social distancing guidelines and shelter-in-place mandates suddenly caused a major increase in the need to deliver remote clinical services (Sullivan-Baca et al., 2022). The aim of the present study was to explore the characteristics of TeleNP use in

Table 4. Commonly reported difficulties and limitations in the use of TeleNP.

Difficulties/limitations	Yes (%)
Not having standardized instruments and adequate norms for TeleNP	94
Loss of qualitative information	93
Not being able to fully observe the patient's behavior	90
Patient's audio, video, or internet failures	88
Patient's distraction by environmental stimuli	83
Not being able to assess all cognitive domains	83
Lack of an adequate space for assessment	77
Concerns regarding assessment validity	74
Neuropsychologist's audio, video, or internet failures	72
Patient received help with response	63
Patient's lack of mastery of device	61
Privacy vulnerability	58
Patient fatigue	52
Difficulty establishing rapport	41
Patient's lack of cooperation or motivation	41
Patient's use of external aids during assessment	41
Patient's lack of mastery of platform	22
Neuropsychologist's lack of mastery of device	18

Note. Percentages represent the number of TeleNP users who chose each response to the question "Which difficulties/limitations have you experienced in the use of TeleNP?"

Mexico since the onset of the COVID-19 pandemic. Our descriptive hypothesis, of an increase in this modality for clinical neuropsychology activities during the COVID-19 lockdown, was confirmed. Our results also allowed for assessment of the extent of TeleNP use in these two years, as well as the methodologies, strategies, benefits, and limitations of its application. To our knowledge, this is the first study in Latin America describing the use of TeleNP, either before or since the pandemic, although previous authors have made recommendations on the matter (Crivelli et al., 2022).

A total of 107 clinical neuropsychologists were surveyed, the majority women residing in major cities and with master's or doctoral level training. The geographic distribution of survey respondents is highly consistent with data provided by the AMN website, which reports the highest concentration of neuropsychologists in Mexico City, followed by other states with major cities, including Morelos, Estado de México, Michoacán, Nuevo León, and Yucatán. Our results show that most survey participants currently offer TeleNP services; however, only a small proportion had experience with the use of TeleNP before the outbreak of COVID-19, comparable in general terms with findings of previous work in other parts of the world (Fox-Fuller, Rizer et al., 2022; Guidotti Breting et al., 2020; Hammers et al., 2020; Marra, Hoelzle et al., 2020). This is not surprising, given that remote consultation had not been a major component of clinical neuropsychological care before this public health emergency (Guidotti Breting et al., 2020). Most current users of TeleNP in our sample began to use it during the COVID-19 pandemic, resulting in extensive provision of remote care that is consistent with several other studies (Fox-Fuller, Rizer et al., 2022; Guidotti Breting et al., 2020; Hammers et al., 2020; Marra, Hoelzle et al., 2020; Rochette et al., 2021) and represents an effort to continue providing care in the context of social distancing and lockdown.

Our results also show that many survey participants did not have specific training for the application of TeleNP; most learned through personal experience, literature review, and their colleagues. It is important to recognize that the available literature regarding TeleNP was sparse until the COVID-19 outbreak. Since that time, various associations and institutions have published practice guidelines, articles, and webinars on the subject (American Psychologist Association, 2013; Bilder et al., 2020). It is thus somewhat surprising that a large percentage of respondents reported learning about it through their own experience and from colleagues, without looking for more reliable resources such as webinars or training courses. Rochette et al. (2021) report that 88.8% of the U.S. neuropsychologists

surveyed in their study used at least three or more educational resources to develop their TeleNP protocols, including guidelines from professional organizations, literature reviews, and webinars. Our findings may reflect a lack of access to such training opportunities for economic or language reasons. Nevertheless, many aspects of TeleNP use found in our study were similar to those of other reports, including the frequent use of the home-to-home modality, perceived benefits, limitations, and methodology.

Methodology and implemented modifications

Our results show differences in the extent to which different TeleNP services were provided by survey respondents. Interviews, delivery of results, psychoeducation, and intervention were commonly provided by TeleNP; different types of assessment (e.g., brief assessment, screening) were less often provided by this modality, especially complete assessments requiring the use of multiple performance tests. These differences in the frequency of services provided through TeleNP have been reported in other studies (Chapman et al., 2020; Hammers et al., 2020; Marra, Hoelzle, et al., 2020) and could be related to factors such as practical difficulties, legal issues, and ethical concerns (Hammers et al., 2020). Despite respondents performing assessments using TeleNP less frequently than other services, almost half did so, but less than reported in others survey studies (Fox-Fuller, Rizer et al., 2022; Rochette et al., 2021). Consistent with data from the United States (Fox-Fuller, Rizer et al., 2022), respondents reported using TeleNP most frequently from home to home, followed by clinic to home; clinic-to-clinic use was minimal.

Respondents reported that the majority of patients they attend with TeleNP were adults, followed by children and adolescents, and to a lesser extent older adults. The lower numbers of older adults seen with TeleNP could be related to personal characteristics such as diagnosis, disease severity, age, or level of technology use (Hewitt et al., 2020). Older individuals may have less access to and experience with telehealth technologies than their younger counterparts (Chapman et al., 2020; Fox-Fuller, Rizer et al., 2022; Parikh et al., 2013). This could be an especially important factor in a middle-income country such as Mexico, in which older adults tend to have significantly lower levels of education; it may thus have important implications for the implementation of remote services (Sullivan-Baca et al., 2022). A 2015 survey in Mexico examining conventional person-to-person neuropsychological practice found that after neurodevelopmental disorders, dementias

were the most frequently assessed conditions (Fonseca-Aguilar et al., 2015), which suggests a contrast to the prevalence of adults in our survey of the population assessed with TeleNP.

Although most practitioners in our sample reported obtaining informed consent from their patients, close to 30% reported not doing so. This omission could be driven by difficulty in obtaining signed consent forms at a distance (Chapman et al., 2020), but it could also be related to the lack of proper legal regulation of psychological practice in Mexico. Articles 23, 35, 61, 62, and 118–124 of the ethical code of the Mexican Psychological Society (Sociedad Mexicana de Psicología, SMP, 2010) clearly state that informed consent must always be obtained from patients or their legal guardians, that the use of online platforms poses limitations to psychological services and could limit confidentiality, and that patients must be informed of such risks and limitations; it also specifies that if video recordings are to be made to reliably observe a patient's performance, explicit permission must be given (SMP, Sociedad Mexicana de Psicología, SMP, 2010). Despite these guidelines, Mexico lacks the appropriate organization to supervise and enforce these regulations. Informed consent is always required for the use of TeleNP, so that users fully understand the risks and limitations involved (Rochette et al., 2021). To facilitate the signing of informed consent forms, the Working Group recommendations for the use of TeleNP in Latin America suggest the use of digital e-consent with a system guaranteeing information access, user identity, and security; it recommends the use of REDCap (Crivelli et al., 2022).

Nearly all the respondents to our survey reported using Zoom® as the platform for TeleNP, which is consistent with the results of previous studies in other countries (Fox-Fuller, Rizer et al., 2022; Rochette et al., 2021). Google Meet® and WhatsApp® were other frequently used videoconferencing technologies, but with these platforms there is a confidentiality risk. In Mexico there is no law similar to the Health Insurance Portability and Accountability Act (U.S. Department of Health & Human Services, 2021), and the use of these platforms for TeleNP in this and other Latin American countries is risky. For all these reasons, it is important for the psychologists' code of ethics to formulate new rules and specifications for the use of digital platforms. Almost half of the sample also used telephone calls; although there is no specific data on their use, they were probably used for support in case of difficulty with videoconference sessions, as was also found by Fox-Fuller, Rizer, et al. (2022).

Most respondents to our survey reported that TeleNP assessment sessions had the same duration as face-to-face sessions, although the time required with the

remote modality is greater both for assessments and interventions. This is an important point to keep in mind in making clinical decisions: providing services with TeleNP may be feasible for non-urgent cases, but where completion of a diagnostic or therapeutic process is required as soon as possible, it may be better to do it in person rather than remotely.

Challenges, limitations, and benefits

The major limitations in the use of TeleNP found in our survey likely relate to economic and social constraints preventing access to adequate telecommunication devices and services. The 2020 National Survey on the Availability and Use of Information Technology in Homes (Instituto Nacional de Estadística y Geografía, 2021) found that 96% of the Mexican population uses cell phones to connect to the internet and less than 35% use laptops. Although 72% of the country uses the internet, only 50% of the population in rural areas has access to this service. TeleNP guidelines and related articles recommend the use of a computer or tablet of at least 7 inches for neuropsychological evaluations (Chapman et al., 2020; Cullum et al., 2014; Fox-Fuller, Ngo et al., 2022; Franco-Martin et al., 2012); however, our survey found that a high percentage of practitioners allowed patients to use smartphones to perform all or part of the assessment, given the unavailability of equipment. Given this situation, it is important to validate the use of smartphones for TeleNP in Mexico and other countries with similar socioeconomic characteristics.

Although survey respondents reported a high frequency of TeleNP use, they described less certainty in their diagnoses and the effectiveness of interventions with its use. This uncertainty could be associated with the lack of standardized instruments, the difficulty in observing behavior during evaluation, and the loss of qualitative information with TeleNP. According to Rochette et al. (2021), the lack of standardized tests and normative data for the application of instruments using TeleNP is one of the principal factors affecting the reliability of the modality. Although some studies have shown the equivalence of remote and face-to-face administrations of traditional neuropsychological tasks (Brearly et al., 2017), much more analysis is required. Studies similar to Allegret et al. (2021), Cullum et al. (2014), Parks et al. (2021), and Fox-Fuller, Ngo, et al. (2022) must be carried out in Latin American countries in order to support such findings and develop remote test administration protocols (Bilder et al., 2020; Chapman et al., 2020).

The benefits of TeleNP reported by survey respondents include lower cost, an increase in the number and

variety of patients seen without geographic constraints, greater access to different populations, the opportunity to learn different methods of assessment, and lower health risks during the pandemic. In addition to these, other authors (Fox-Fuller, Ngo et al., 2022; Hammers et al., 2020; Rochette et al., 2021) have found less time wasted in travel, less fatigue, and expanded availability of mental health care. Our survey respondents also noted feeling satisfied with the benefits of TeleNP. These issues should be noted, since they might encourage professionals to adopt TeleNP as part of their regular practice even after face-to-face activities resume, to make their practice more effective and personalized.

Overall, our survey suggests that TeleNP is a feasible practice for clinical neuropsychologists, and its effectiveness could be improved by addressing the concerns we have noted. It would also be important to know the perspective of patients in the assessment of its validity, reliability, and clinical practicality. Although authors in other countries have found adequate patient satisfaction (Appleman et al., 2021; Parsons et al., 2022), they also describe infrastructural limitations that could be greater in our population (Serrano-Juárez et al., 2023).

Possible solutions to the difficulties of TeleNP

As already noted, with outbreak of the COVID-19 pandemic there was a lack of information about the different environmental factors that could interfere with the use of TeleNP. Neuropsychologists implemented strategies to control these factors and established criteria to select appropriate candidates for online assessment. According to our survey, the main requirements for patients to be candidates for TeleNP are to have a device (computer, laptop, tablet, or smartphone), a stable internet connection, and sufficient language skills (comprehension and expression). Several authors (American Psychologist Association, 2013; Arias et al., 2020; Bilder et al., 2020; Crivelli et al., 2022; Fox-Fuller, Rizer et al., 2022) have made additional suggestions for the use of TeleNP, and Scott et al. (2022) provide ethical recommendations for the application of clinical-home, home-home, and hybrid models. However, research and guidelines, similar to Serrano-Juárez et al. (2023), that consider the specific situation in Mexico could provide solutions to the limitations we have described.

Limitations of this study

This study aimed to understand the state of TeleNP use in Mexico during the COVID-19 pandemic. Although it finds that TeleNP could be feasible and applicable for clinical practice, training and validity studies are

required for greater certainty. There are some specific limitations to our study that might have influenced the results. One of these is our sample type: using a snowball sample potentially reduces the representation of a broader set of viewpoints. For example, an important proportion of participants reported providing TeleNP services mostly to adults and children, with a lower proportion of older adults seen in this modality; the snowball sampling recruitment method may have over-represented respondents specializing in these populations. However, the survey was carried out when the COVID-19 lockdown was still in effect, and this was the strategy that allowed us to recruit the greatest number of respondents. Another limitation is that this study did not address the patient perspective on TeleNP, which could lead to greater understanding of its feasibility in our population. Despite these limitations, our study provides an overview of the state of the art of TeleNP use in Mexico and suggests the implementation of new strategies, including the creation of instruments and manuals for the clinical application of TeleNP in Mexico that could be of use in similar middle-income countries.

Future Directions of TeleNP in Mexico

One of the main findings of this study is that most survey participants began using TeleNP as a result of the COVID-19 pandemic, which is consistent with the findings of other studies (Fox-Fuller, Rizer, et al., 2022; Hammers et al., 2020; Rochette et al., 2021; Zane et al., 2021). Although respondents reported feeling satisfied with TeleNP use, most described feeling less comfortable and perceived lower reliability in their diagnoses and interventions, given the limitations of the modality, than with in-person care. Most respondents reported only informal training, and almost 30% did not routinely request written informed consent. In contrast to reports of practices in high-income countries, many respondents allow the use of smartphones in TeleNP, given a lack of technological resources. Most respondents, including TeleNP non-users, expressed their intention to use TeleNP in the future. The creation and standardization of instruments, clinical trials, and intervention studies specific to our population and resources are important to confirm the reliability of TeleNP and improve the certainty of assessments, diagnoses, and interventions. Ethical guidelines for the application of TeleNP also require adequate education and supervised practice in its application (Scott et al., 2022). Webinars and curricular courses on the ethical, clinical, and technological aspects of TeleNP should be

prioritized and made readily available to Mexican practitioners.

It is important to consider that the use of and perceptions about TeleNP services may not be consistent across all countries, geographic locations (e.g., urban versus rural areas), or cultures, which limits the generalization of results (Chapman et al., 2020; Rochette et al., 2021). These perceptions may also depend on specific population characteristics (e.g., age, educational level, medical diagnosis), work settings (e.g., private practice versus community clinic), or provider-related factors, such as neuropsychological field (clinical, investigation, forensic), type of service provided (assessment, rehabilitation), professional experience (graduate student, supervisor), and level of experience with technology and with the use of TeleNP (empirical knowledge, formal training; Bilder et al., 2020; Chapman et al., 2020; Luxton et al., 2014; Marra, Hoelzle et al., 2020).

In conclusion, as in other countries, the use of TeleNP in Mexico increased markedly with the COVID-19 pandemic and is now considered a viable alternative to performing assessment, diagnosis, and treatment in selected cases, with certain benefits for clinicians and patients. Nonetheless, practitioners should keep in mind the limitations inherent in this practice, as it is a relatively new format for delivering neuropsychological services.

Most of the sample in our survey has embraced the use of TeleNP, encountering clinical, technical, and methodological challenges and limitations that are similar to those reported in other countries. These limitations have created some concern among respondents as to diagnostic certainty, however, continued practice and formal training could help increase confidence in their clinical skills for assessment, diagnosis, and intervention using this modality. Most of our sample feel satisfied with this modality, perceive that it is easy to use, and plan to continue using it in the future. Addressing the lack of formal TeleNP training and adherence to ethical guidelines regarding the routine use of informed consent were identified as specific needs. Given the technological characteristics of the Mexican and other low- and middle-income country populations, further studies analyzing the adequacy of smartphone use in TeleNP are also needed.

The findings reported here add to the body of work on this growing area and may be useful in addressing the challenges and limitations encountered by professionals in this evolving discipline. Future studies should analyze the use of TeleNP beyond the COVID-19 pandemic, and specifically in Mexico, efforts should be made to increase opportunities and access to formal TeleNP training.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

The author(s) reported there is no funding associated with the work featured in this article.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author, CASJ, upon reasonable request in serranojcarlosa@comunidad.unam.mx

References

- Alegret, M., Espinosa, A., Ortega, G., Pérez-Cordón, A., Sanabria, Á., Hernández, I., Marquié, M., Rosende Roca, M., Mauleón, A., Abdelnour, C., Vargas, L., de Antonio, E. E., López-Cuevas, R., Tartari, J. P., Alarcón-Martín, E., Tárraga, L., Ruiz, A., Boada, M., & Valero, S. (2021). From Face-to-Face to Home-to-Home: Validity of a Teleneuropsychological Battery. *Journal of Alzheimer's Disease : JAD*, 81(4), 1541–1553. <https://doi.org/10.3233/JAD-201389>
- American Psychologist Association. (2013). Guidelines for the practice of telepsychology. *American Psychologist*, 68, 791–800. <https://doi.org/10.1037/a0035001>
- Appleman, E. R., O'Connor, M. K., Boucher, S. J., Rostami, R., Sullivan, S. K., Migliorini, R., & Kraft, M. (2021). Teleneuropsychology clinic development and patient satisfaction. *The Clinical Neuropsychologist*, 35(4), 819–837. <https://doi.org/10.1080/13854046.2020.1871515>
- Arias, F., Safi, D. E., Miranda, M., Carrión, C. I., Diaz Santos, A. L., Armendariz, V., Jose, I. E., Vuong, K. D., Suarez, P., Strutt, A. M., & Consortium, S. T. A. R. (2020). Teleneuropsychology for monolingual and bilingual Spanish-speaking adults in the time of COVID-19: Rationale, professional considerations, and resources. *Archives of Clinical Neuropsychology: The Official Journal of the National Academy of Neuropsychologists*, 35(8), 1249–1265. <https://doi.org/10.1093/arclin/aca100>
- Bilder, R. M., Postal, K. S., Barisa, M., Aase, D. M., Cullum, C. M., Gillaspay, S. R., Harder, L., Kanter, G., Lanca, M., Lechuga, D. M., Morgan, J. M., Most, R., Puente, A. E., Salinas, C. M., & Woodhouse, J. (2020). InterOrganizational practice committee recommendations/guidance for teleneuropsychology (TeleNP) in response to the COVID-19 pandemic. *The Clinical Neuropsychologist*, 34(7–8), 1314–1334. PubMed. <https://doi.org/10.1080/13854046.2020.1767214>
- Bloch, A., Maril, S., & Kavé, G. (2021). How, when, and for whom: Decisions regarding remote neuropsychological assessment during the 2020 COVID-19 pandemic. *Israel Journal of Health Policy Research*, 10(1), 31. <https://doi.org/10.1186/s13584-021-00465-x>
- Brearly, T. W., Shura, R. D., Martindale, S. L., Lazowski, R. A., Luxton, D. D., Shenal, B. V., & Rowland, J. A. (2017). Neuropsychological test administration by videoconference:

- A systematic review and meta-analysis. *Neuropsychology Review*, 27(2), 174–186. <https://doi.org/10.1007/s11065-017-9349-1>
- Chapman, J. E., Ponsford, J., Bagot, K. L., Cadilhac, D. A., Gardner, B., & Stolwyk, R. J. (2020). The use of videoconferencing in clinical neuropsychology practice: A mixed methods evaluation of neuropsychologists' experiences and views. *Australian Psychologist*, 55(6), 618–633. <https://doi.org/10.1111/ap.12471>
- Crivelli, L., Quiroz, Y. T., Calandri, I. L., Martin, M. E., Vellilla, L. M., Cusicanqui, M. I., Yglesias, F. C., Llibre-Rodríguez, J. J., Armele, M., Román, F., Barceló, E., Dechent, C., Carello, M. A., Olavarria, L., Yassuda, M. S., Custodio, N., Dansilio, S., Sosa, A. L., Acosta, D. M., Allegri, R. F. (2022). Working group recommendations for the practice of teleneuropsychology in Latin America. *Archives of Clinical Neuropsychology: The Official Journal of the National Academy of Neuropsychologists*, 37(3), 553–567. PubMed. <https://doi.org/10.1093/arclin/acab080>
- Cullum, C. M., Hynan, L. S., Grosch, M., Parikh, M., & Weiner, M. F. (2014). Teleneuropsychology: Evidence for video teleconference-based neuropsychological assessment. *Journal of the International Neuropsychological Society*, 20(10), 1028–1033. Cambridge Core. <https://doi.org/10.1017/S1355617714000873>
- Fernández-Pinto, I., Santamaría, P., Sánchez-Sánchez, F., Carrasco, M., & Del Barrio, V. (2015). SENA. In Sistema de Evaluación de Niños y Adolescentes. Madrid: TEA Ediciones.
- Fonseca-Aguilar, P., Olabarrieta-Landa, L., Rivera, D., Aguayo Arelis, A., Ortiz Jiménez, X. A., Rabago Barajas, B. V., Rodríguez Agudelo, Y., Álvarez, E., & Arango-Lasprilla, J. C. (2015). Situación actual de la práctica profesional de la neuropsicología en México. *Psicología desde el Caribe*, 32(3), 344–364. <https://doi.org/10.14482/psdc.32.3.7896>
- Fox-Fuller, J. T., Ngo, J., Pluim, C. F., Kaplan, R. I., Kim, D.-H., Anzai, J. A. U., Yucebas, D., Briggs, S. M., Aduen, P. A., Cronin-Golomb, A., & Quiroz, Y. T. (2022). Initial investigation of test-retest reliability of home-to-home teleneuropsychological assessment in healthy, English-speaking adults. *The Clinical Neuropsychologist*, 36(8), 2153–2167. <https://doi.org/10.1080/13854046.2021.1954244>
- Fox-Fuller, J. T., Rizer, S., Andersen, S. L., & Sunderaraman, P. (2022). Survey findings about the experiences, challenges, and practical advice/solutions regarding teleneuropsychological assessment in adults. *Archives of Clinical Neuropsychology: The Official Journal of the National Academy of Neuropsychologists*, 37(2), 274–291. PubMed. <https://doi.org/10.1093/arclin/acab076>
- Franco-Martin, M. A., Bernardo-Ramos, M., & Soto-Pérez, F. (2012). Ciber-Neuropsicología: Aplicación de nuevas tecnologías en la evaluación neuropsicológica. *Actas españolas de psiquiatría*, 40(6), 308–314. <https://actaspsiquiatria.es/repositorio/14/80/ESP/14-80-ESP-308-314-303722.pdf>
- Guidotti Breting, L. M., Towns, S. J., Butts, A. M., Brett, B. L., Leaffer, E. B., & Whiteside, D. M. (2020). 2020 COVID-19 American Academy of Clinical Neuropsychology (AACN) Student Affairs Committee survey of neuropsychology trainees. *The Clinical Neuropsychologist*, 34(7–8), 1284–1313. <https://doi.org/10.1080/13854046.2020.1809712>
- Hammers, D. B., Stolwyk, R., Harder, L., & Cullum, C. M. (2020). A survey of international clinical teleneuropsychology service provision prior to and in the context of COVID-19. *The Clinical Neuropsychologist*, 34(7–8), 1267–1283. <https://doi.org/10.1080/13854046.2020.1810323>
- Hewitt, K. C., Rodgin, S., Loring, D. W., Pritchard, A. E., & Jacobson, L. A. (2020). Transitioning to telehealth neuropsychology service: Considerations across adult and pediatric care settings. *The Clinical Neuropsychologist*, 34(7–8), 1335–1351. <https://doi.org/10.1080/13854046.2020.1811891>
- Instituto Nacional de Estadística y Geografía. (2021). *Encuesta Nacional sobre Disponibilidad y Uso de Tecnologías de la Información en los Hogares (ENDUTIH) 2021*. <https://www.inegi.org.mx/programas/dutih/2021>
- Koterba, C. H., Baum, K. T., Hamner, T., Busch, T. A., Davis, K. C., Tlustos-Carter, S., Howarth, R., Fournier-Goodnight, A., Kramer, M., Landry, A., O'Neill, J., Cass, J., Wilson, C., & Slomine, B. S. (2020). COVID-19 issues related to pediatric neuropsychology and inpatient rehabilitation – Challenges to usual care and solutions during the pandemic. *The Clinical Neuropsychologist*, 34(7–8), 1380–1394. <https://doi.org/10.1080/13854046.2020.1811892>
- Luxton, D. D., Pruitt, L. D., & Osenbach, J. E. (2014). Best practices for remote psychological assessment via telehealth technologies. *Professional Psychology, Research and Practice*, 45(1), 27–35. <https://doi.org/10.1037/a0034547>
- Marra, D. E., Hamlet, K. M., Bauer, R. M., & Bowers, D. (2020). Validity of teleneuropsychology for older adults in response to COVID-19: A systematic and critical review. *The Clinical Neuropsychologist*, 34(7–8), 1411–1452. PubMed. <https://doi.org/10.1080/13854046.2020.1769192>
- Marra, D. E., Hoelzle, J. B., Davis, J. J., & Schwartz, E. S. (2020). Initial changes in neuropsychologists clinical practice during the COVID-19 pandemic: A survey study. *The Clinical Neuropsychologist*, 34(7–8), 1251–1266. <https://doi.org/10.1080/13854046.2020.1800098>
- Nasreddine, Z. S., Phillips, N. A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., Cummings, J. L., & Chertkow, H. (2005). The Montreal cognitive assessment, MoCA: A brief screening tool for mild cognitive impairment. *Journal of the American Geriatrics Society*, 53(4), 695–699. <https://doi.org/10.1111/j.1532-5415.2005.53221.x>
- Parikh, M., Grosch, M. C., Graham, L. L., Hynan, L. S., Weiner, M., Shore, J. H., & Cullum, C. M. (2013). Consumer acceptability of brief videoconference-based neuropsychological assessment in older individuals with and without cognitive impairment. *The Clinical Neuropsychologist*, 27(5), 808–817. PubMed. <https://doi.org/10.1080/13854046.2013.791723>
- Parks, A. C., Davis, J., Spresser, C. D., Stroescu, I., & Ecklund-Johnson, E. (2021). Validity of in-home teleneuropsychological testing in the wake of COVID-19. *Archives of Clinical Neuropsychology: The Official Journal of the National Academy of Neuropsychologists*, 36(6), 887–896. PubMed. <https://doi.org/10.1093/arclin/acab002>
- Parlar, M. E., Spilka, M. J., Wong Gonzalez, D., Ballantyne, E. C., Dool, C., Gojmerac, C., King, J., McNeely, H., & MacKillop, E. (2020). “You can't touch

- this”: Delivery of inpatient neuropsychological assessment in the era of COVID-19 and beyond. *The Clinical Neuropsychologist*, 34(7–8), 1395–1410. <https://doi.org/10.1080/13854046.2020.1810324>
- Parsons, M. W., Gardner, M. M., Sherman, J. C., Pasquariello, K., Grieco, J. A., Kay, C. D., Pollak, L. E., Morgan, A. K., Carlson-Emerton, B., Seligsohn, K., Davidsdottir, S., Pulsifer, M. B., Zarrella, G. V., Burstein, S. M., & Mancuso, S. M. (2022). Feasibility and acceptance of direct-to-home tele-neuropsychology services during the COVID-19 pandemic. *Journal of the International Neuropsychological Society*, 28(2), 210–215. Cambridge Core. <https://doi.org/10.1017/S1355617721000436>
- Pérez, P. K., Ramos Usuga, D., & Arango Lasprilla, J. C. (2021). Teleneuropsicología en países de habla hispana: Una mirada crítica al uso de Tecnologías de Información y Comunicación en la evaluación neuropsicológica. *Revista Iberoamericana de Neuropsicología*, 4(1), 1–27. <https://neuropsychologylearning.com/portfolio-item/teleneuropsicologia-paises-habla-hispana-mirada-critica-uso-tecnologias-comunicacion-evaluacion-neuropsicologica/>
- Rochette, A. D., Rahman-Filipiak, A., Spencer, R. J., Marshall, D., & Stelmokas, J. E. (2021). Teleneuropsychology practice survey during COVID-19 within the United States. *Applied Neuropsychology: Adult*, 1–11. <https://doi.org/10.1080/23279095.2021.1872576>
- Scott, T. M., Marton, K. M., & Madore, M. R. (2022). A detailed analysis of ethical considerations for three specific models of teleneuropsychology during and beyond the COVID-19 pandemic. *The Clinical Neuropsychologist*, 36(1), 24–44. <https://doi.org/10.1080/13854046.2021.1889678>
- Serrano-Juárez, C. A., Reyes-Méndez, C., Prieto-Corona, B., Seubert-Ravelo, A. N., Moreno-Villagómez, J., Cabañas-Tinajero, J.-Á., Yáñez-Téllez, M. G., Quezada-Torres, R. A., Téllez-Rodríguez, M., Barrera-Rodríguez, B., Soto-Jiménez, M. P., González-Gutiérrez, F. A., & Castillo-Tejeda, E. (2023). A systematic review and a Latin American clinical model for teleneuropsychological assessment. *Archives of Clinical Neuropsychology*, 38(2), 283–300. <https://doi.org/10.1093/arclin/acac077>
- Sociedad Mexicana de Psicología, SMP. (2010). *Código Ético del Psicólogo (5ta ed.)*. Trillas.
- Sullivan-Baca, E., Babicz, M. A., Choudhury, T. K., & Miller, B. I. (2022). The relationship between health literacy and comfort with teleneuropsychology in a veteran sample. *Archives of Clinical Neuropsychology*, 37(2), 292–301. <https://doi.org/10.1093/arclin/acab079>
- U.S. Department of Health & Human Services. (2021). *Notification of enforcement discretion for telehealth remote communications during the COVID-19 nationwide public health emergency*. [www.HHS.Gov.https://www.hhs.gov/hipaa/for-professionals/special-topics/emergency-preparedness/notification-enforcement-discretion-telehealth/index.html](https://www.hhs.gov/hipaa/for-professionals/special-topics/emergency-preparedness/notification-enforcement-discretion-telehealth/index.html)
- Yeroushalmi, S., Maloni, H., Costello, K., & Wallin, M. T. (2020). Telemedicine and multiple sclerosis: A comprehensive literature review. *Journal of Telemedicine and Telecare*, 26(7–8), 400–413. <https://doi.org/10.1177/1357633X19840097>
- Zane, K. L., Thaler, N. S., Reilly, S. E., Mahoney, J. J., & Scarisbrick, D. M. (2021). Neuropsychologists’ practice adjustments: The impact of COVID-19. *The Clinical Neuropsychologist*, 35(3), 490–517. <https://doi.org/10.1080/13854046.2020.1863473>

Appendix

English version

Survey on the Use of Teleneuropsychology in Mexico since the COVID-19 Pandemic Outbreak

The objective of this study is to learn more about the use of Teleneuropsychology by professionals in the field and to investigate issues related to this technology in Mexico since the start of the COVID-19 pandemic.

Informed Consent

The aim of this study is to learn more about the use of Teleneuropsychology by professionals in the field and to investigate issues related to this technology in Mexico since the start of the COVID-19 pandemic.

You have been invited to participate in this study as a clinical neuropsychologist. Your participation is completely voluntary.

Procedures. Your participation involves the completion of this survey, which will take 10-20 minutes.

Requirements to participate. Have completed a postgraduate degree in clinical neuropsychology, either in Mexico or its equivalent abroad; have an active clinical practice in Mexico.

Privacy and confidentiality. All the information you provide us will be strictly confidential, that is, it will be used only by the project researchers and will not be available for any other purpose. To protect your identity, we will assign you a number that we will use to identify your data and we will use that number instead of your name in our databases, which will be stored on a hard drive and will have a password that only the principal investigator will have access to. The data collected from respondents may be used to present the results of the research in scientific forums and published in scientific journals; however, no data that reveals your identity will be disclosed.

I declare that I have been fully informed about the possible risks, inconveniences, inconveniences, and benefits derived from my participation in the study.

By clicking and continuing with the questionnaire, you indicate your agreement to voluntarily participate in this study.

I agree to participate in the study by filling out this survey.

Yes

No

Demographics

(1) E-mail: _____

(2) Sex:

Male

Female

(1) Age: _____

Information from your clinical practice:

(1) Degree in:

Psychology

Medicine

Pedagogy

Other

(1) To practice neuropsychology I studied:

Master's degree in the area of neuropsychology

Doctorate in the area of neuropsychology or neurosciences

Certificate program in neuropsychology

Specialty in neuropsychology

(1) State in which you reside and practice neuropsychology:

- Aguascalientes
- Baja California
- Baja California Sur
- Campeche
- Chiapas
- Chihuahua
- Mexico City
- Coahuila
- Colima
- Durango
- Guanajuato
- Guerrero
- Hidalgo
- Jalisco
- Estado de México
- Michoacán
- Morelos
- Nayarit
- Nuevo León
- Oaxaca
- Puebla
- Querétaro
- Quintana Roo
- San Luis Potosí
- Sinaloa
- Sonora
- Tabasco
- Tamaulipas
- Tlaxcala
- Veracruz
- Yucatán
- Zacatecas

(2) City in which you reside: _____

Use of teleneuropsychology (TeleNP)

Teleneuropsychology is understood as the remote application of clinical neuropsychology practices using audiovisual technology for purposes of evaluation, diagnosis, or intervention.

(1) Have you ever used TeleNP?

Never.

Since before the pandemic.

Since before the pandemic, but increased its use during the pandemic.

Only since the pandemic.

(1) How have you been trained to use TeleNP?

References

Courses

Webinars

Conferences

Colleagues

Personal experience

(1) What services have you provided through TeleNP?

Patient interview
 Interview with an informant
 Evaluation with screening tests
 Evaluation using scales or inventories
 Brief evaluation (interview and minimum of necessary tools including performance tests)
 Full evaluation (same as would be done in person)
 Delivery of results
 Follow-up/reassessment
 Intervention
 Coaching
 Psychoeducation

(1) Which of the following scenarios describes your use of TeleNP?

Clinic-Clinic
 Clinic-Home
 Home-Home

(1) With which of the following have you used TeleNP services:

Children
 Adolescents
 Adults
 Older adults

(1) During the pandemic, how many patients on average have you seen with TeleNP in a week?

Less than 1
 2
 3
 4
 5
 More than 5

(1) Since the pandemic, has the number of patients you have seen weekly:

Increased
 Decreased
 Remained the same

(1) For which of the following reasons have you provided TeleNP services?

Clinical (diagnosis and intervention)
 Research
 Forensic

(1) Have you cared for patients with the following conditions?

Neurodevelopmental disorders (ADHD, ASD, intellectual disability, language disorder, learning disorder, etc.)
 Brain damage
 Cerebrovascular disease
 Genetic disorders
 Epilepsy

Neoplasms
 Neurodegenerative diseases (Alzheimer's, Parkinson's, other dementias, etc.).
 Demyelinating diseases
 Psychiatric disorders
 Pre- and post-surgical evaluation
 COVID-19 or post-COVID syndrome
 Neuroinfection (by HIV, neurocysticercosis, etc.)
 Metabolic diseases
 Autoimmune diseases

(1) Have you requested written informed consent for TeleNP services?

Yes
 No

(1) What technical requirements do you require of patients to receive services with TeleNP?

Have a laptop or computer.
 Have a tablet.
 Have a smartphone with a large screen.
 Telecommunication device has adequate audio and video quality.
 Have stable internet.

(1) What personal criteria or characteristics must patients have to receive services with TeleNP?

Have sufficient language skills for effective communication.
 Have a minimum age.
 Have a distraction-free environment.
 Have support from a third person.
 Be able to follow rules properly.
 Not present serious sensory or motor alterations.
 Not present major attentional alterations.

(1) What percentage of your patients are not candidates for services through TeleNP because they do not meet the criteria for physical or personal resources?

(2) Reasons I have decided not to provide patients with TeleNP services:

The patient did not have sufficient language skills for effective communication.
 The patient's age.
 The patient did not have a distraction-free environment.
 The patient did not have support from a third person.
 The patient was not able to follow rules properly.
 The patient had severe sensory or motor disturbances.
 The patient presented serious alterations in attention.
 The patient did not have a telecommunication device (laptop, computer, tablet, etc.).
 The patient did not have internet or a stable connection.
 The patient was not sufficiently familiar with technological resources.

(1) What platform have you used to provide services through TeleNP?

Telephone call

Zoom
 Google Meet
 Skype
 Facetime
 Google Hangouts
 Microsoft Teams
 Webex Meet
 WhatsApp
 Telegram
 Messenger

(1) What devices do you use for TeleNP?

Computer
 Laptop
 Tablet
 Smartphone
 Telephone

(1) What devices are your patients using to receive TeleNP services?

PC
 Laptop
 Tablet
 Smartphone
 Telephone

Assessment instruments and sessions

(1) What scales, inventories, and tests do you use most frequently in your TeleNP practice? Please write the names of the instruments (for example, WISC-IV, PIEN, etc.).
 (2) What kind of adaptations have you made to the tests for use in TeleNP?

Eliminated subtests that did not fit the modality.
 Scanned or photographed stimuli.
 Asked the patient/carer to print material.
 Extended response times.
 Asked the patient to write on the shared screen.

(1) Please describe any other adaptations you have made to the tests for use in TeleNP.
 (2) The average number of sessions to complete a TeleNP assessment is:

The same as in a face-to-face assessment.
 More than in a face-to-face assessment.
 Fewer than in a face-to-face assessment.

(1) The duration of each evaluation session using TeleNP is

The same as in a face-to-face evaluation.
 More than in a face-to-face evaluation.
 Less than in a face-to-face evaluation.

(1) The average number of sessions to complete a TeleNP intervention program is:

The same as in a face-to-face evaluation.
 More than in a face-to-face evaluation.
 Fewer than in a face-to-face evaluation.
 I do not do interventions.

TeleNP satisfaction

(1) Do you have the same certainty about your diagnostic conclusions when you evaluate using TeleNP?

Yes.
 Less certainty.
 Greater certainty.

(1) Do you think that carrying out an intervention with TeleNP will provide the same results as the intervention in face-to-face mode?

Yes.
 More limited results.
 Better results.

(1) What are the difficulties or limitations you have faced when using TeleNP?

Maintaining privacy vulnerability during video calls.
 Not being able to adequately observe the patient's behavior.
 Not having instruments normalized and standardized for this modality.

Patients are helped by people around them in performing tests.

Patients are distracted by stimuli around them.

Patients do not have a suitable place to perform the evaluation.

Not being able to adequately assess all cognitive domains.

Losing qualitative data from the patient's performance.

Legal repercussions for violating privacy.

Patient's technological problems (audio or video failures and internet)

My own technological problems (audio or video failures and internet)

My own lack of privacy.

Greater patient fatigue compared to face-to-face modality.

Greater difficulty in establishing rapport compared to face-to-face modality.

Little patient collaboration or motivation.

Patient uses external aids to solve the tests (notes, calculator, etc.).

Uncertainty regarding the validity of evaluations in this modality.

Patient lack of familiarity with the use of video call platforms.

My own lack of familiarity with the use of video call platforms.

Patient lack of familiarity with the use of the communication device.

My own lack of familiarity with the use of the communication device.

(1) It was easy for me to provide services with TeleNP.

Disagree
 Agree

(1) I am satisfied with providing my services with TeleNP.

Disagree
 Agree

(1) The use of TeleNP has felt:

Less comfortable than providing services face-to-face.
Just as comfortable as providing services face-to-face.
More comfortable than providing services face-to-face.

(1) Will you continue to provide services with TeleNP after the pandemic?

Yes, I will continue to provide services fully online.
No, I will return to 100% face-to-face services.
I will use both modalities.

(1) What advantages has the TeleNP use had for you?

Increased knowledge of and experience in the use of information and communication technologies.
Learning different assessment methods.
Ability to serve populations with limited access to neuropsychological services.
Continue my professional practice (academic or clinical) during the pandemic.
More time to carry out other activities (not necessarily professional).
Saving money.
Less exposure to health risks (own and others’).

(1) If you have not used TeleNP, please indicate why:

Lack of information.
Lack of research on TeleNP.
Lack of technological resources.
Lack of standardized and validated instruments for online application.
I don’t think I’m familiar enough with technology tools.
I am not comfortable providing my services through TeleNP.
I do not have the adequate physical space to do it.
We appreciate your involvement!

Spanish Version

Encuesta sobre el uso de la TeleNeuropsicología en México a partir de la pandemia por COVID-19.

El objetivo del estudio es conocer el uso de la TeleNeuropsicología por profesionales en el área e indagar acerca de aspectos relacionados con esta práctica en México a partir del inicio de la pandemia por COVID-19.

Consentimiento Informado

Usted ha sido invitado(a) a participar en este estudio por ser neuropsicólogo clínico. Su participación es completamente voluntaria.

Procedimientos. Su participación implica el llenado de esta encuesta, lo que le tomará entre 10 y 20 minutos.

Requisitos para participar. Haber concluido un posgrado en neuropsicología clínica, ya sea en México o su equivalente en el extranjero; tener una práctica clínica activa y ejercer la disciplina en México.

Privacidad y confidencialidad. Toda la información que usted nos proporcione será de carácter estrictamente confidencial, es decir, será utilizado únicamente por los investigadores del proyecto y no estará disponible para ningún otro propósito. Para proteger su identidad le asignaremos un número que utilizaremos para identificar sus datos

y usaremos ese número en lugar de su nombre en nuestras bases de datos, la cual será resguardada en un disco duro y contará con una contraseña a la que solo la investigadora principal tendrá acceso. Los datos recabados de todos los participantes podrán ser utilizados para presentar los resultados de la investigación en foros científicos y publicados en revistas científicas; sin embargo, ningún dato que revele su identidad será divulgado.

Declaro que se me ha informado ampliamente sobre los posibles riesgos, inconvenientes, molestias y beneficios derivados de mi participación en el estudio.

Al dar click y continuar con el cuestionario, indica usted su aceptación para participar voluntariamente en el presente estudio.

Acepto participar en el estudio mediante el llenado de esta encuesta

No

Si

Datos demográficos

(1) Correo electrónico

(2) Sexo

- Mujer
- Hombre

(3) Edad

Información de su práctica clínica

(1) Estudié mi licenciatura en:

- Psicología
- Medicina
- Pedagogía
- Otros:

(2) Para practicar neuropsicología estudié: Si/No

- Una maestría en el área de neuropsicología
- Un doctorado en el área de neuropsicología o neurociencias
- Un diplomado en neuropsicología
- Una especialidad en neuropsicología

(3) Estado en el que reside y practica la neuropsicología:

- Aguascalientes
- Baja California
- Baja California Sur
- Campeche
- Chiapas
- Chihuahua
- CDMX
- Coahuila
- Colima
- Durango
- Guanajuato
- Guerrero
- Hidalgo
- Jalisco
- Estado de México
- Michoacán
- Morelos
- Nayarit
- Nuevo León
- Oaxaca
- Puebla
- Querétaro
- Quintana Roo
- San Luis Potosí

- Sinaloa
- Sonora
- Tabasco
- Tamaulipas
- Tlaxcala
- Veracruz
- Yucatán
- Zacatecas

(4) Ciudad en la que reside

Uso de teleneuropsicología (TeleNP)

La teleneuropsicología se entiende como la aplicación remota de las prácticas de la neuropsicología clínica utilizando tecnología audiovisual para motivos de evaluación, diagnóstico o intervención.

(1) ¿Ha practicado la TeleNP?

- Nunca
- Desde antes de la pandemia
- Desde antes de la pandemia, pero incrementé su uso a partir de ésta
- Sólo a partir de la pandemia

(2) ¿Cómo se ha capacitado para el uso de TeleNP? Si/No

- Literatura
- Cursos
- Webinars
- Congresos
- Colegas
- Empíricamente

(3) ¿Qué servicios ha proporcionado mediante TeleNP? Si/No

- Entrevista al paciente
- Entrevista a un informante
- Evaluación con pruebas de cribado
- Evaluación únicamente usando escalas/inventarios
- Evaluación breve (entrevista y mínimo de herramientas necesarias incluyendo pruebas de desempeño)
- Evaluación completa (igual a la que se haría de manera presencial)
- Entrega de resultados
- Seguimiento/reevaluación
- Intervención
- Asesoría
- Psicoeducación

(4) ¿En qué escenarios se han encontrado usted y su paciente, respectivamente, durante la práctica de la TeleNP? Si/No

- clínica - clínica
- clínica - casa
- casa - casa

(5) Ha brindado servicios de TeleNP a: Si/No

- Niños
- Adolescentes
- Adultos
- Adultos mayores

(6) Durante la pandemia ¿cuántos pacientes en promedio ha atendido mediante TeleNP en una semana?

- Menos de 1
- 1
- 2
- 3
- 4

• 5

• más de 5

(7) A partir de la pandemia, el número de pacientes que atiende semanalmente ha:

- Incrementado
- Decrementado
- Se ha mantenido igual

(8) Ha brindado servicios de TeleNP con motivos

- Clínicos (diagnóstico e intervención)
- Investigación
- Forense

(9) ¿Ha atendido pacientes con los siguientes padecimientos?

- Trastornos de neurodesarrollo (TDAH, TEA, discapacidad intelectual, trastorno de lenguaje, trastorno de aprendizaje, etc.)
- Traumatismo craneoencefálico
- Enfermedad cerebrovascular
- Trastornos genéticos
- Epilepsia
- Neoplasias
- Enfermedades neurodegenerativas (Enfermedad de Alzheimer, Parkinson, otras demencias, etc.)
- Enfermedades desmielinizantes
- Trastornos psiquiátricos
- Evaluación pre y post-quirúrgica
- COVID-19 o síndrome post-COVID
- Neuroinfección (por VIH, neurocisticercosis, etc.)
- Enfermedades metabólicas
- Enfermedades autoinmunes

(10) En su práctica de TeleNP, ¿ha dado a firmar consentimiento informado?

- Si
- No

(11) ¿Con qué requisitos técnicos deben contar los pacientes para que reciban sus servicios mediante TeleNP? Si/No

- Que tengan laptop o PC
- Que tengan tablet
- Que tengan smartphone con pantalla grande
- Que el dispositivo de comunicación tenga una adecuada calidad de audio y video
- Que tengan internet estable

(12) ¿Qué criterios o características deben tener los pacientes para que reciban sus servicios mediante TeleNP? Si/No

- Que tenga habilidades de lenguaje suficientes para una comunicación efectiva
- Que tengan una edad mínima
- Que cuenten con un entorno libre de distractores
- Que cuenten con apoyo por parte de una tercera persona
- Que sean capaces de seguir reglas adecuadamente
- Que no presenten alteraciones sensoriales o motoras graves
- Que no presente alteraciones atencionales graves

(13) ¿Qué porcentaje de sus pacientes no son candidatos a recibir servicios mediante TeleNP por no cumplir los criterios anteriores (recursos físicos y personales)?

(14) Razones por las que he descartado pacientes para recibir servicios mediante TeleNP Si/No

- Que no tenga habilidades de lenguaje suficientes para una comunicación efectiva
- Por su edad

- Que no cuenten con un entorno libre de distractores
 - Que no cuenten con apoyo por parte de una tercera persona
 - Que no sean capaces de seguir reglas adecuadamente
 - Que presenten alteraciones sensoriales o motoras graves
 - Que presente alteraciones atencionales graves
 - Que no cuenten con un dispositivo de telecomunicación (laptop, PC, tablet, etc.)
 - Que no cuenten con internet o una conexión estable
 - Que estén suficientemente familiarizados con los recursos tecnológicos
- (15) ¿Qué plataforma ha usado para proporcionar servicios mediante TeleNP? Si/No
- Llamada telefónica
 - Zoom
 - Google Meet
 - Skype
 - Facetime
 - Google Hangouts
 - Microsoft Teams
 - Webex Meet
 - WhatsApp
 - Telegram
 - Messenger
- (16) ¿Qué dispositivos emplea usted para practicar la TeleNP? Si/No
- PC
 - Laptop
 - Tablet
 - Smartphone
 - Teléfono
- (17) ¿Qué dispositivo emplean sus pacientes para recibir los servicios de TeleNP? Si/No
- PC
 - Laptop
 - Tablet
 - Smartphone
 - Teléfono

Instrumentos de evaluación y sesiones

- (1) ¿Qué escalas, inventarios y pruebas usa con mayor frecuencia en su práctica de la TeleNP? Escriba por favor los nombres específicos de los instrumentos (por ejemplo, WISC-IV, PIEN, etc).
- (2) ¿Qué tipo de adaptaciones ha realizado a las pruebas para su uso en TeleNP? Si/No
- Eliminar subpruebas que no se adaptan a la modalidad
 - Escanear o fotografiar estímulos
 - Pedir al paciente/cuidador que imprima material
 - Aumentar los tiempos de respuesta
 - Pedir al paciente que haga anotaciones en la pantalla compartida
- (3) Describa alguna otra adaptación que haya realizado a las pruebas para su uso en TeleNP
- (4) El número de sesiones promedio para completar una evaluación mediante TeleNP es:
- Igual a una evaluación presencial
 - Mayor a una evaluación presencial
 - Menor a una evaluación presencial
- (5) La duración de cada sesión de evaluación en modalidad TeleNP es:

- Igual a una evaluación presencial
 - Mayor a una evaluación presencial
 - Menor a una evaluación presencial
- (6) El número de sesiones promedio para completar un programa de intervención mediante TeleNP es:
- Igual a una intervención presencial
 - Mayor a una intervención presencial
 - Menor a una intervención presencial
 - No realizo intervención

Satisfacción con la TeleNP

- (1) ¿Tiene la misma certeza sobre sus conclusiones diagnósticas cuando realiza una evaluación mediante TeleNP?
- Sí
 - Menor certeza
 - Mayor certeza
- (2) ¿Cree usted que realizar una intervención mediante TeleNP brindará los mismos resultados que la intervención en modalidad presencial?
- Sí
 - Resultados más limitados
 - Mejores resultados
- (3) ¿Cuáles son las dificultades o limitaciones con las que se ha enfrentado al utilizar TeleNP? Si/No
- Vulnerabilidad de privacidad durante las videollamadas
 - No poder observar adecuadamente la conducta del paciente
 - No contar con instrumentos normalizados y estandarizados para esta modalidad
 - Que los pacientes sean ayudados por personas a su alrededor en la ejecución de las pruebas
 - Que el paciente se distraiga con diferentes estímulos que están a su alrededor
 - Que los pacientes no tengan un lugar adecuado para realizar la evaluación
 - No poder evaluar adecuadamente todos los dominios cognitivos
 - Perder datos cualitativos de la ejecución del paciente
 - Tener repercusiones legales por vulnerar la privacidad
 - Problemas tecnológicos del paciente (fallas de audio o video e internet)
 - Problemas tecnológicos propios (fallas de audio o video e internet)
 - Falta de privacidad del evaluador
 - Mayor cansancio del paciente en comparación a modalidad presencial
 - Mayor dificultad para establecer rapport en comparación con modalidad presencial
 - Poca colaboración o motivación del paciente
 - Que el paciente utilice ayudas externas para resolver las pruebas (notas, calculadora, etc.)
 - Incertidumbre respecto a la validez de las evaluaciones en esta modalidad
 - Poca familiaridad por parte de los pacientes con el uso de las plataformas de videollamada
 - Poca familiaridad por parte del evaluador con el uso de las plataformas de videollamada
 - Poca familiaridad por parte de los pacientes con el uso del dispositivo de comunicación

- Poca familiaridad por parte del evaluador con el uso del dispositivo de comunicación
- (4) ¿Me ha sido fácil proporcionar servicios mediante TeleNP?
- Totalmente en desacuerdo 1 2 3 4 5 Totalmente de acuerdo
- (5) Me siento satisfecho brindando mis servicios mediante TeleNP
- Totalmente en desacuerdo 1 2 3 4 5 Totalmente de acuerdo
- (6) Con el uso de la TeleNP se ha sentido
- Menos confortable que brindando los servicios de manera presencial
 - Igual de confortable que brindando los servicios de manera presencial
 - Más confortable que brindando los servicios de manera presencial
- (7) ¿Continuará brindando servicios mediante TeleNP posterior a la pandemia?
- Sí, seguiré brindando servicios completamente en línea
 - No, regresaré a servicios 100% presenciales
 - Usaré ambas modalidades
- (8) ¿Qué ventajas ha tenido para usted la práctica de la TeleNP? Si/No

- Mayor conocimiento y experiencia con el uso de las TICs
- Aprendizaje de diferentes métodos de evaluación
- Posibilidad de atender a poblaciones con acceso limitado a los servicios neuropsicológicos
- Continuar con mi práctica profesional (académica o laboral) durante la pandemia
- Mayor tiempo para realizar otras actividades (no necesariamente de índole profesional)
- Ahorro de dinero
- Exposición a menores riesgos a la salud (propia y de terceras personas)

Sobre no usar TeleNP

- (1) Elija porque decidió no hacer uso de la TeleNP

- Falta de información
 - Falta de investigación de la TeleNP
 - Falta de recursos tecnológicos
 - Falta de instrumentos estandarizados y con validez
 - No me siento familiarizado con el uso de la tecnología
 - No me siento cómodo realizando TeleNP
 - No tengo el espacio para llevarlo a cabo
- Muchas gracias por su participación