

Original

Teleneuropsychological assessment in South America: A perspective from patients and neuropsychologists

Evaluación teleneuropsicológica en América del Sur: Una perspectiva desde los pacientes y los neuropsicólogos

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Abstract

Teleneuropsychology (teleNP) in Argentina was promoted by the COVID-19 pandemic. This investigation aimed to evaluate patients' and neuropsychologists' satisfaction with teleNP and to identify the advantages and disadvantages of its use. 41 patients with mild cognitive impairment and 35 neuropsychologists from Argentina were surveyed. Both groups were sent a questionnaire by e-mail to evaluate their satisfaction and preferences regarding teleNP. Patients were sent the survey after being cognitively evaluated by teleNP. Outcomes reflected a 91% degree of satisfaction with teleNP, with no differences between patients and specialists ($p = 0.112$). Regarding patients, 50% had no predilection regarding evaluation modality, and 35.7% preferred teleNP. The main benefits identified were accessibility to remote areas (72.4%), and comfort of performing the assessment at home (57.14%). Moreover, 74.3% of practitioners reported that the principal difficulty was the patient's lack of familiarity with the technology, and 60% a deficiency in environmental control. TeleNP cognitive evaluation has a high degree of acceptability for practitioners and patients. The main obstacles identified are network connection problems and the lack of familiarity with technology. The principal advantages come from accessing isolated areas. This suggests that this practice will remain relevant beyond the pandemic context.

Keywords: Teleneuropsychology; COVID-19; Cognitive assessment; Telehealth; Telemedicine

Resumen

La teleneuropsicología (teleNP) en Argentina fue promovida por la pandemia del COVID-19. Esta investigación se propuso evaluar la satisfacción de pacientes y neuropsicólogos con la teleNP e identificar las ventajas y desventajas de su uso. Se encuestaron 41 pacientes con deterioro cognitivo leve y 35 neuropsicólogos de Argentina. A ambos grupos se les envió un cuestionario por correo electrónico para evaluar su satisfacción y preferencias respecto a la teleNP. A los pacientes se les envió la encuesta después de ser evaluados cognitivamente mediante teleNP. Los resultados reflejaron un grado de satisfacción con la teleNP del 91%, sin diferencias entre pacientes y especialistas ($p = 0.112$). En cuanto a los pacientes, el 50% no tenía predilección por ninguna modalidad de evaluación, y el 35.7% prefería la telePN. Los principales beneficios identificados fueron la accesibilidad a zonas remotas (72.4%), y la comodidad de realizar la evaluación en casa (57.14%). Por otra parte, el 74.3% de los profesionales informaron de que la principal dificultad era la falta de familiaridad del paciente con la tecnología, y el 60% una deficiencia en el control del entorno. La evaluación cognitiva TeleNP tiene un alto grado de aceptabilidad para los profesionales y los pacientes. Los principales obstáculos identificados son los problemas de conexión a la red y la falta de familiaridad con la tecnología. Las principales ventajas provienen del acceso a zonas aisladas. Esto sugiere que esta práctica seguirá siendo relevante más allá del contexto pandémico.

Palabras clave: Teleneuropsicología; COVID-19; Evaluación cognitiva; Telesalud; Telemedicina

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INTRODUCTION

Telepsychology is defined as the provision of psychological services using telecommunication technologies. Telecommunication is the preparation, transmission, communication, or related processing of information by electrical, electromagnetic, electromechanical, electro-optical, or electronic means (Committee on National Security Systems-CNSS, 2010). Telephone, mobile devices, interactive videoconferencing, e-mail, chat, text, and internet are examples of telecommunication technologies (e.g., Self-help websites, blogs, and social media). The information sent may be written or may include images, sounds, or other data. It can be synchronous, with multiple parties communicating in real time (e.g., interactive videoconferencing, telephone), or asynchronous, with multiple parties communicating in the background (e.g., e-mail).

Also, teleneuropsychology (teleNP) was defined by The Inter-Organizational Practice Committee as “the use of audiovisual technology to establish clinical contact with patients for neuropsychological assessments”, recognizing that teleNP has reduced accessibility problems and enabled the provision of health services through the Information of Communications and Technology (ICT) during the global health emergency because of the coronavirus pandemic (COVID-19).

Regarding the history of teleNP, the first use of this technology in the field of neuropsychology could be traced back to 1969, when the Wechsler scales were automated (CNSS, 2010). Over the years, several studies on the use and validity of teleNP as an alternative assessment modality have been conducted worldwide, mainly in Anglo-Saxon countries (Elwood & Griffin, 1972; Galusha-Glasscock et al., 2016; Chappell & Zimmer, 1999; Rentz et al., 2016; Soto-Pérez et al., 2010; Stricker et al., 2020; Wadsworth et al., 2018). However, teleNP was not an option in Argentina until the COVID-19 pandemic arose. The global impact of the COVID-19 pandemic drove the development of teleNP in Argentina. Literature indicates that teleNP may offer reliable and valid assessments (Crivelli et al., 2021).

Some of the advantages of using teleNP for the patient are broader access to services and better use of time (Morris et al., 2007), reduced costs in travel, increased comfort, and the possibility of obtaining a more rapid diagnosis. On the other hand, for the examiner, the advantages include greater clinical care capacity, a reduction in travel costs, a greater number of assessment and treatment alternatives, and increased productivity (Morris et al., 2007). Similarly, it is believed that remote assessment could lead to a reduction in practice-associated expenses for the examiner. Other possible advantages of teleNP for the examiner include increased access to multidisciplinary work, the opportunity to observe the patient's environment in more detail, and the possibility of advancing part of the neuropsychological assessment process by identifying clinical needs in advance during the virtual clinical interview (Harrell et al., 2014; Cullum et al., 2014).

The COVID-19 pandemic and mandatory preventive social isolation (ASPO) have led to changes in the organization and utilization of the healthcare system throughout the world (Bilder et al., 2020).

In Argentina, between March 1 and July 31, 2020, compared to the same period in 2019, adults' face-to-face consultations for cognitive assessment decreased significantly because they belong to the at-risk population (Calandri et al., 2021).

Furthermore, Argentina's public health authorities implemented isolation measures structured in five phases. The first phase of the quarantine started on March 20 – 31, 2020, and was called strict quarantine; this policy only authorized the circulation of essential services (health personnel, security forces, among others), and population mobility decreased by up to 10%. The second phase was called controlled isolation. This phase started on April 1 – April 12, 2020, allowing a 25% increase in new permits and mobility. The third phase started on April 13 – May 10, 2020, and was called geographic segmentation, allowing mobility to decrease by up to 50%. Numerous cities along the country and rural areas moved to phase four according to epidemiological criteria. The fourth phase was called progressive reopening, allowing up to 75% circulation. This phase started on May 10 – July 17, 2020. Finally, the fifth phase started on July 18 – August 16 and was called new normality, allowing new authorizations, increased circulation, and appealing to social responsibility.

In this highly restrictive context, teleNP was adopted and implemented in this context to avoid the interruption of cognitive assessment. The primary goal of this study was to assess patients' and neuropsychologists' satisfaction with the use of teleNP during Argentina's mandatory preventive social isolation period.

Reporting the experience that professionals and patients have had with this modality will make it possible to identify the benefits and difficulties that are encountered in practice. In this sense, with this information, it will be possible to improve and consolidate the positive aspects and to eliminate those that are not practical or useful so that in this way, teleNP is implemented as an alternative to face-to-face and not only as a compliment (Crivelli et al., 2021).

METHODOLOGY

Participants

A group of 35 neuropsychologists (Age: 41.3 +/-17.1) from Neurological Centers, General hospitals, and specific neuropsychological units in Argentina who were using the Fleni-ECaD (Evaluación Cognitiva a Distancia) teleNP battery were surveyed. In addition, 41 patients (Age: 54.9 +/-18.4) recruited from a Memory Clinic in Buenos Aires were recruited to complete a survey (Table 1). Before any procedure, all participants signed an informed consent form that was approved by the Institutional Review Board (IRB) (Table 1).

TABLE 1. *Demographic Results.*

Neuropsychologists	Patients
N: 35	N: 41
Age: 41.3 +/-17.1	Age: 54.9 +/-18.4

Source: Authors.

Assessment battery

The assessment was performed following the recommendations from the Latin American Teleneuropsychology Working Group (Crivelli et al., 2021).

The cognitive battery administered to the patient group was the Fleni-ECaD protocol, a comprehensive cognitive battery that includes tests for multiple cognitive domains.

Fleni-ECaD is an exhaustive neuropsychological battery that is administered remotely by video conference and includes: the (MOCA), the Rey Auditory-Verbal List (RAVLT), the Boston Naming Test (30 items), the Semantic Verbal Fluency (animal category), the Phonological Verbal Fluency, the Trail Making Test A (TMTA) and B (TMTB) oral version, the Digit Span Forward and Backward (WAIS-IV), the Clock Drawing Test and the Rey Osterrieth Complex Figure (copy and delayed recall).

The patient group had been assessed via teleNP, using an institutional network, which secured confidentiality. The assessment was completed in a single interview and lasted approximately 40 minutes.

Patient's Survey

In a separate interview, posterior to the neuropsychological evaluation, patients were invited to participate in a survey. The survey was meant to assess their degree of satisfaction and to collect feedback regarding the previous neuropsychological evaluation.

Patients were asked to use a five-point Likert scale to respond to a series of statements about the testing modalities: “I Strongly Agree, I Agree, Neutral, I Disagree, I Strongly Disagree.” Examples of those statements include: “Overall, I was satisfied with the videoconference testing session,” “The testing instructions during video conference testing were easy to understand,” “I was concerned about my privacy during video conference testing,” and “I felt comfortable with the video conference equipment” are some examples of those statements. Participants were also asked to choose their preferred testing modality and explain why (See [Appendix 1](#) for complete survey in Spanish).

Neuropsychologist's Survey

A group of neuropsychologists from various centers across the country who used the Fleni-ECaD battery were also invited to participate in a brief survey to rate their experience performing the cognitive assessments via videoconference.

Neuropsychologists were asked to use a five-point Likert scale to respond to a series of statements about satisfaction and adaptation: “I Strongly Agree, I Agree, Neutral, I Disagree, I Strongly Disagree.” Examples of those statements include: “I have been satisfied providing videoconference neuropsychological assessments”, “It has been difficult for me to adapt to the teleNP modality,” “Videoconference evaluations are just as valid/reliable as face-to-face evaluations”, “I have had problems with the sound during video conference evaluations” and “I have had problems with visual quality during video conference evaluations.” The neuropsychologists were also asked to identify their preferred testing modality as well as the advantages and disadvantages of teleNP (See [Appendix 2](#) for the complete survey in Spanish).

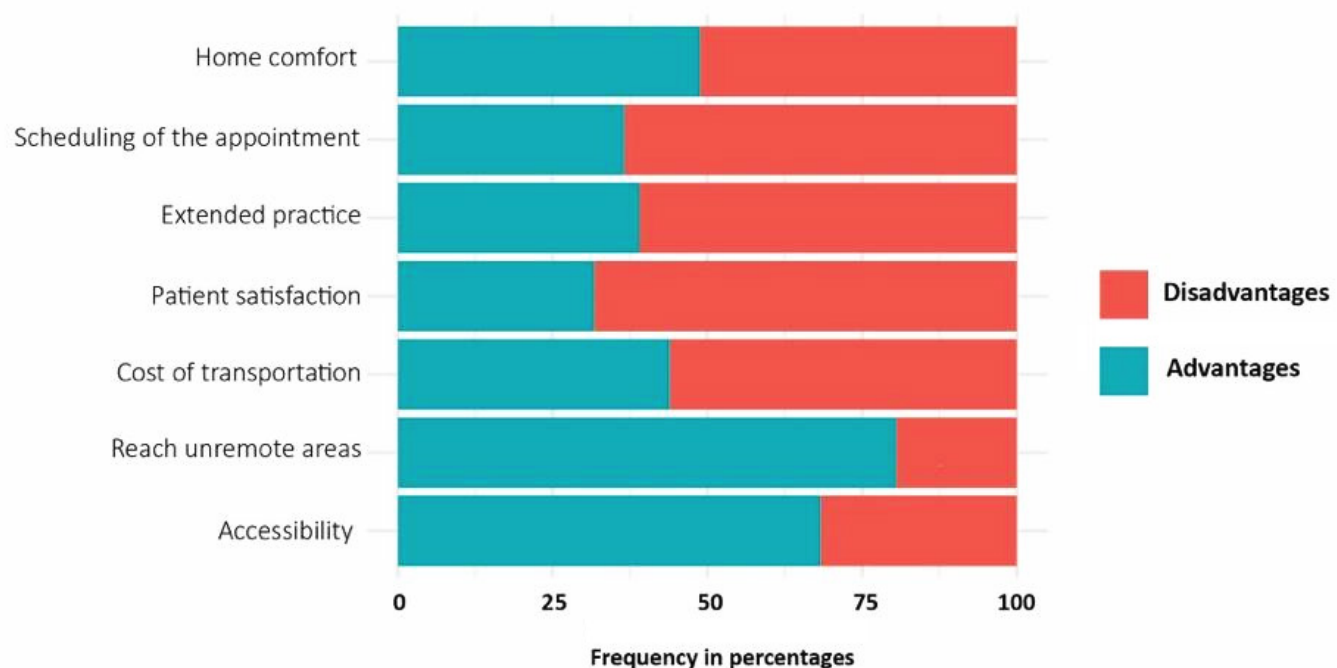
Statistical Analysis

The responses to the surveys were pondered using percentages. A Fisher’s chi-square correction test was used to compare the satisfaction across groups.

RESULTS

In the neuropsychological group, 71% had no inconvenience when adapting to the teleNP modality. In addition, 31% of them had connection problems, mainly related to visual quality. Only 22.85% of the neuropsychologists preferred to evaluate face-to-face, and the remaining 74% reported no preferences. The reported main benefits of teleNP were related to the extended practice that allows accessibility in remote, rural, and isolated areas. In addition, 74.3% of the surveyed neuropsychologists reported that the main difficulty is the lack of patients’ familiarity with technology ([Figure 1](#)).

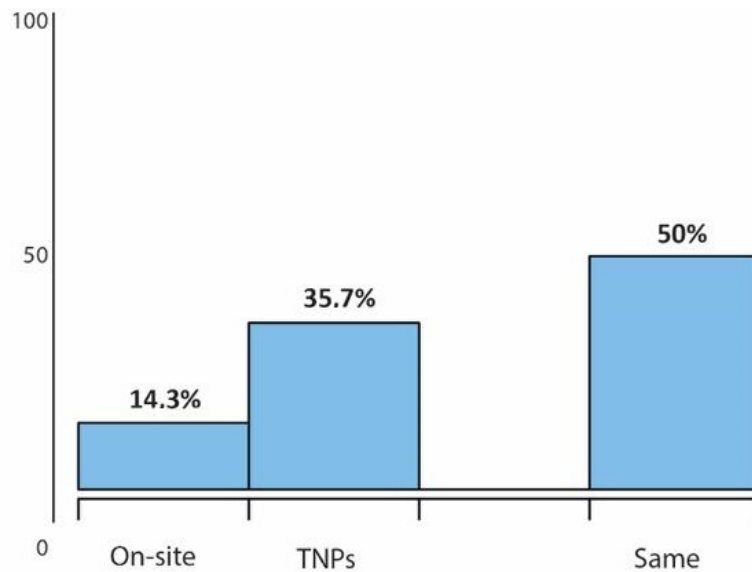
FIGURE 1. *Advantages and Disadvantages according to Neuropsychologists.*



Source: Authors.

When inquired about the main reason for consultation, patients reported memory problems (70.73%), attention problems (46.34%), and naming (56%). Regarding assessment modality, 50% of the patients indicated no preference concerning the assessment modality, and 35.7% preferred teleNP (Figure 2). Furthermore, 93% of the patients felt comfortable with the videoconferencing equipment and the neuropsychologist, and none of them had any concerns about their privacy (Figure 3). Remarkably, 100% of patients stated that they would recommend teleNP (Figure 5; Table 2).

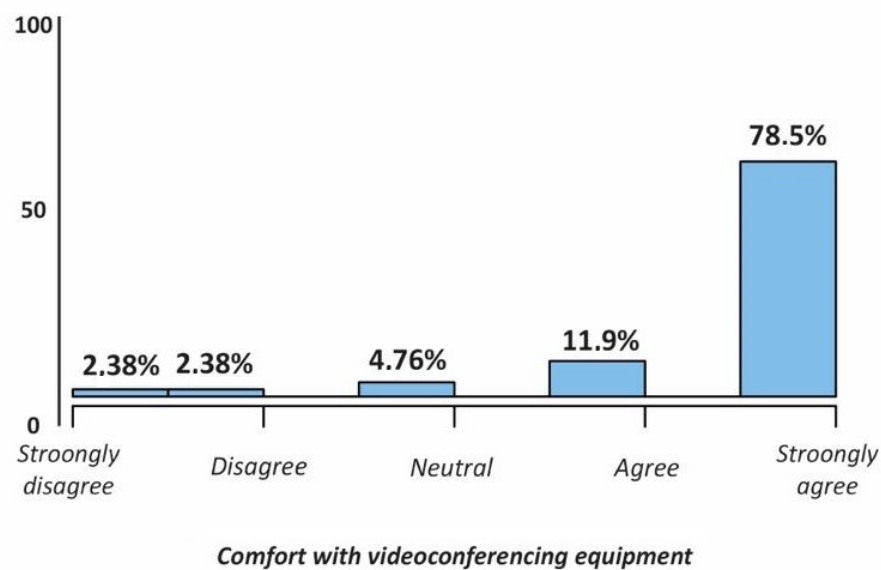
FIGURE 2. Patients' assessment modality.



Source: Authors.

Satisfaction with teleNP was compared across groups, using a Fisher's chi-square correction, and no significant differences were found ($p = 0.112$).

FIGURE 3. Comfort with videoconferencing equipment.



Source: Authors.

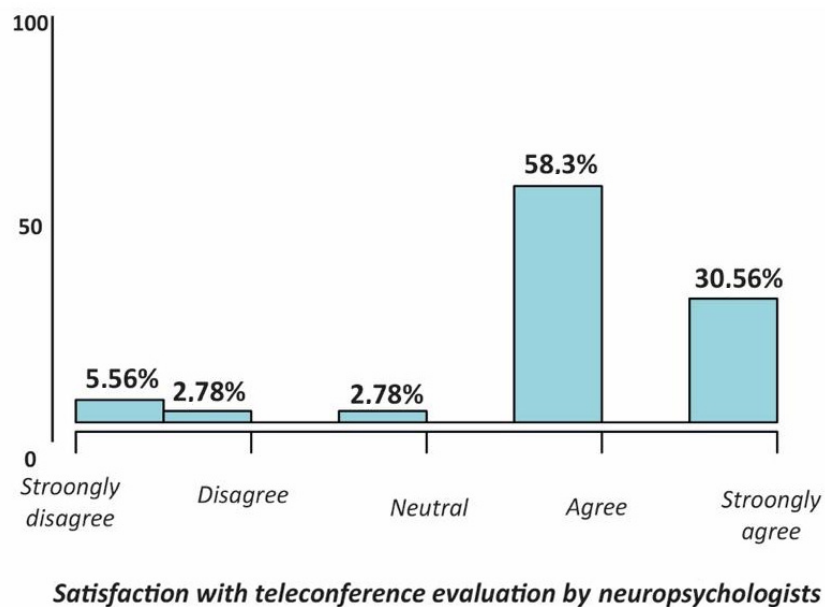
TABLE 2. *Survey's Results.*

Variable	Neuropsychologists	Patients
Satisfaction with the assessment.	91.4%	90.3%
Connection problems.	31.42%	
Sound problems.	8.56%	
Visual quality problems.	17.13%	
No concern for privacy.		100%
Would recommend teleNP.		100%
Principal advantage.	Accessibility 77.14%. Remote areas 94.3%. Expanded practice 45.7%. Home comfort 57.14%.	Less anxiety 22%. Easy to communicate 22%. Easy to concentrate 22%.
Main difficulty.	Lack of patients' familiarity with technology 74.3%.	

Source: Authors.

DISCUSSION

The goal of this study was to assess patients' and neuropsychologists' satisfaction with teleNP, as well as its acceptability and the benefits and drawbacks of its use.

FIGURE 4. *Neuropsychologists' satisfaction.*

Source: Authors.

This study reports that teleNP has high acceptability in both neuropsychologists and patients (Figure 4). The results reflected 91% of satisfaction, with no significant differences between patients and neuropsychologists ($p = 0.112$). This high degree of satisfaction suggests that this is a practice that will be able to continue and grow in the clinic of neuropsychology. 50% of patients had no preference for the evaluation modality, while 35.7% preferred the teleNP. The principal benefits identified related to teleNP were the accessibility in remote areas (72.4%) and the comfort of the home (57.14%). The main difficulty, according to 74.3% of practitioners, is a lack of familiarity with the technology, while 60% believe the main difficulty is a lack of control over

the environment in the patient’s home. These are the first findings on Latin American teleNP acceptability and satisfaction, as well as the perspectives of patients and neuropsychologists.

Similar findings were obtained in a recent paper about the experiences, challenges, and practical advice/solutions regarding teleNP assessment in adults (Fox-Fuller et al., 2022). They discovered the same challenges, such as internet connection problems, environmental distractions in the examinees’ homes (e.g., pets, children, partners, unexpected loud noises), and a lack of familiarity with the technology.

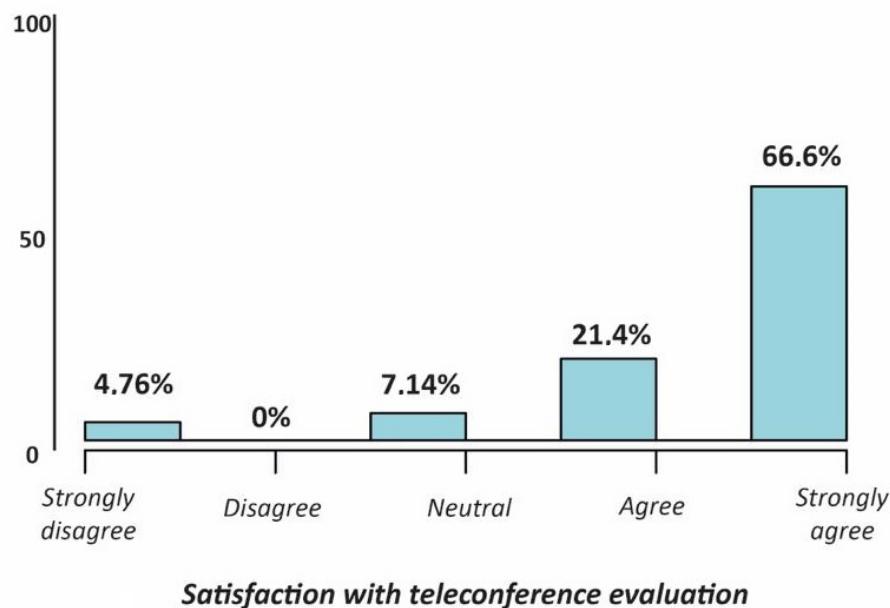
There are some limitations to this study. First, the patients’ group only included adult participants. Including children’s experience with teleNP assessment would add to a more comprehensive perspective. Also, the complete sample (neuropsychologists and patients) was limited to individuals living in Argentina. Thus, the results can only be applied to similar populations. Despite these limitations, the results of this investigation are promising for using teleNP in Latin America.

Future investigations should study and evaluate the experience and degree of satisfaction of individuals who work in remote cognitive assessment with children and teenagers. In addition, comparing the level of satisfaction in LMIC (low and middle-income countries) and high-income countries would also provide interesting knowledge.

CONCLUSIONS

In Argentina, cognitive assessment using teleNP has been successfully implemented as an alternative during health emergencies. The findings of this study show that it is well-accepted by both neuropsychologists and patients. The most significant challenges identified are related to connection issues, visual quality, and a lack of familiarity with the technology (Figure 5). The main benefits are related to the ability to reach patients in remote areas (Figure 5). The high level of satisfaction suggests that this practice will continue to grow and serve as a resource after the COVID-19 pandemic is over.

FIGURE 5. Patients’ satisfaction.



Source: Authors.

APPENDIX

APPENDIX 1. *Patients Survey in Spanish.*

Edad	<p>¿Cuál fue el motivo por el que realizó la evaluación cognitiva? (Marque todo lo que Problemas de atención corresponda).</p> <ul style="list-style-type: none"> <input type="checkbox"/> Problemas de memoria. <input type="checkbox"/> Problemas para nombrar objetos/nombres. <input type="checkbox"/> Problemas para encontrar palabras. <input type="checkbox"/> ACV. <input type="checkbox"/> Enfermedad de Alzheimer. <input type="checkbox"/> Enfermedad de Parkinson. <input type="checkbox"/> Epilepsia. <input type="checkbox"/> Otra enfermedad actual. <input type="checkbox"/> Antecedentes familiares por enfermedad neurológica. <input type="checkbox"/> Otro. 	<p>En general, quedé satisfecho con la evaluación por videoconferencia.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Totalmente en desacuerdo. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo. 	<p>¿Qué condición de evaluación le gustó más? (Marque uno).</p> <ul style="list-style-type: none"> <input type="checkbox"/> Me gustó más la evaluación presencial. <input type="checkbox"/> Me gustó más la evaluación por videoconferencia. <input type="checkbox"/> Ambas por igual. <input type="checkbox"/> Realice únicamente la evaluación presencial. <input type="checkbox"/> Realice únicamente la evaluación por videoconferencia.
<p>Me sentí cómodo con el equipo de videoconferencia.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Totalmente en desacuerdo. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo. 	<p>Las instrucciones de la evaluación durante la videoconferencia fueron fáciles de entender.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Si. <input type="checkbox"/> No. 	<p>Estuve preocupado por mi privacidad durante la evaluación por videoconferencia.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Si. <input type="checkbox"/> No. 	<p>Mi comodidad con el examinador fue la misma durante la evaluación por videoconferencia que de manera presencial.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Si. <input type="checkbox"/> No. <input type="checkbox"/> Realice únicamente evaluación presencial. <input type="checkbox"/> Realice únicamente evaluación por videoconferencia.
<p>¿Recomendaría la evaluación cognitiva por videoconferencia a otros?</p> <ul style="list-style-type: none"> <input type="checkbox"/> Si. <input type="checkbox"/> No. 	<p>¿Qué le gustó de la evaluación presencial? (Marque todo lo que corresponda).</p> <ul style="list-style-type: none"> <input type="checkbox"/> Es más fácil establecer una conexión personal con el examinador. <input type="checkbox"/> Es más fácil comunicarse con el examinador cuando estamos en la misma habitación. <input type="checkbox"/> Es más fácil manipular los materiales de la evaluación. <input type="checkbox"/> No realicé evaluación presencial. 	<p>¿Qué le gustó de la evaluación por videoconferencia? (Marque todas las opciones que correspondan).</p> <ul style="list-style-type: none"> <input type="checkbox"/> Se sintió menos ansioso/nervioso sin un examinador en la habitación. <input type="checkbox"/> Es más fácil comunicarse con el examinador por videoconferencia. <input type="checkbox"/> Es más fácil concentrarse sin un examinador en la sala. <input type="checkbox"/> El equipo de videoconferencia hizo que la evaluación fuera más interesante y/o divertida. 	<p>Si necesitara ver a un psicólogo para este tipo de pruebas, ¿cuánto tiempo estaría dispuesto a viajar para realizar la evaluación en modalidad presencial? Por favor marque solo una respuesta.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Menos de 1 hora 1-3 horas. <input type="checkbox"/> 3-6 horas. <input type="checkbox"/> Manejaría / viajaría tan lejos como fuera necesario y pasaría la noche, si fuera necesario. <input type="checkbox"/> Preferiría no viajar y realizar una evaluación por videoconferencia.

Source: Authors.

APPENDIX 2. *Neuropsychologists Survey in Spanish.*

<p>Edad</p>	<p>¿Se ha sentido cómodo/a realizando evaluaciones cognitivas por videoconferencia? <input type="checkbox"/> Si. <input type="checkbox"/> No.</p>	<p>He quedado satisfecho/a con las evaluaciones cognitivas por videoconferencia. <input type="checkbox"/> Totalmente en desacuerdo cognitivas por videoconferencia. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo.</p>	<p>Me ha costado adaptarme a la modalidad de Teleneuropsicología. <input type="checkbox"/> Totalmente en desacuerdo cognitivas por videoconferencia. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo.</p>	<p>Las instrucciones de la evaluación por videoconferencia, ¿le resultaron fáciles de explicar? <input type="checkbox"/> Si. <input type="checkbox"/> No.</p>
<p>¿Tuvo problemas con la conexión a la plataforma de Tele-neuropsicología? <input type="checkbox"/> Nunca. <input type="checkbox"/> Raramente. <input type="checkbox"/> Ocasionalmente. <input type="checkbox"/> Frecuentemente. <input type="checkbox"/> Muy frecuentemente.</p>	<p>¿Qué plataforma utilizó? (Marque todas las que correspondan). <input type="checkbox"/> ZOOM. <input type="checkbox"/> MEET. <input type="checkbox"/> SKYPE. <input type="checkbox"/> Plataforma institucional.</p>	<p>He tenido problemas con el sonido durante las evaluaciones por videoconferencia. <input type="checkbox"/> Totalmente en desacuerdo cognitivas por videoconferencia. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo.</p>	<p>He tenido problemas con la calidad visual durante las evaluaciones por videoconferencia. <input type="checkbox"/> Totalmente en desacuerdo cognitivas por videoconferencia. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo.</p>	<p>Las evaluaciones por videoconferencia son igual de válidas/fiables que las evaluaciones presenciales. <input type="checkbox"/> Totalmente en desacuerdo cognitivas por videoconferencia. <input type="checkbox"/> En desacuerdo. <input type="checkbox"/> Ni de acuerdo, ni en desacuerdo. <input type="checkbox"/> De acuerdo. <input type="checkbox"/> Totalmente de acuerdo.</p>
<p>¿Piensa que en el futuro próximo la Teleneuropsicología podrá ser integrada fácilmente al servicio de prestación de salud? <input type="checkbox"/> Si. <input type="checkbox"/> No.</p>	<p>¿Qué tipo de evaluación prefiere realizar? <input type="checkbox"/> Evaluación presencial. <input type="checkbox"/> Evaluación por videoconferencia. <input type="checkbox"/> Ambas.</p>	<p>Para usted, ¿cuáles de estos beneficios o ventajas cree que tiene la Tele-neuropsicología? (Marque todos los que correspondan). <input type="checkbox"/> Accesibilidad. <input type="checkbox"/> Facilidad de llegar a las zonas lejanas. <input type="checkbox"/> Costo del transporte. <input type="checkbox"/> Satisfacción del paciente. <input type="checkbox"/> Práctica ampliada. <input type="checkbox"/> Facilidad de programación de la cita. <input type="checkbox"/> Comodidad del paciente en el entorno del hogar.</p>	<p>¿Y cuáles de estas desventajas cree que tiene la Teleneuropsicología? (Marque todas las que correspondan). <input type="checkbox"/> Costo de la tecnología del hogar. <input type="checkbox"/> Dificultades tecnológicas. <input type="checkbox"/> Familiaridad del paciente con la tecnología. <input type="checkbox"/> Falta de control del entorno. <input type="checkbox"/> Ansiedad/incomodidad con la tecnología. <input type="checkbox"/> Comunicación/señales no verbales. <input type="checkbox"/> Manejo de emergencias.</p>	<p>¿Tiene alguna sugerencia para la Teleneuropsicología?</p>

Source: Authors.

CONTRIBUTOR ROLES

Micaela Maria Arruabarrena: Conceptualization, Investigation, Project administration, Writing-original draft.

Maria Eugenia Martin: Conceptualization, Investigation, Resources.

Ismael Luis Calandri: Formal analysis, Investigation.

Nicolas Corvalan: Formal analysis, Visualization.

Maria Belen Helou: Conceptualización, Resources.

Carlos Martinez Canyazo: Conceptualization, Resources.

Crivelli Lucia: Conceptualization, Investigation, Project administration, Writing-original draft, Supervision.

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