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Teleneuropsychology Evaluation for Adult and Pediatric Patients

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INTRODUCTION

Neuropsychology, which combines psychology and neuroscience, aims to understand the link between the brain and behavior to support the diagnosis and treatment of neurological disorders. This practice traditionnally involves in-person appointments. Teleneuropsychology has been developed in recent years, not only in response to the constraints of the pandemic but also due to technological advances and the desire to improve access to care for people living in remote areas or with reduced mobility. The Health Technology Assessment (HTA) Unit of the CHU de Québec-Université Laval was mandated to evaluate the effectiveness and safety of teleneuropsychology for adult and pediatric patients.

DECISION-MAKING QUESTION

Should teleneuropsychology services be standardized and expanded at the CHU de Québec-Université Laval for adult and pediatric patients?

METHODOLOGY

A review of the scientific and grey literature published in French and English, between January 1st, 2010 and May 13th, 2025, was conducted in several databases to identify systematic reviews, with or without meta-analysis, clinical practice guidelines, and studies in teleneuropsychology. The main outcomes of interest were the equivalence of scores obtained on different standardized tests (e.g., effect size, reliability), internal consistency between administration methods, intra- and inter-rater agreement, test administration time, patient safety, patient experience, and ethical, legal, and organizational aspects. Semi-structured interviews were conducted with neuropsychologists and professionals involved in telehealth at the CHU de Québec-Université Laval between August 29th and September 25th, 2024. These interviews aimed to document clinical practices in neuropsychology and teleneuropsychology, activities performed, tests administered, ethical and legal issues, as well as the advantages and disadvantages, and factors influencing potential large scale implementation. In addition, data extraction from clinical and administrative databases for fiscal years 2021 to 2025 was performed to describe neuropsychology activities, facilities involved, patients sociodemographic characteristics and proportion of patients living more than one hour from the CHU de Québec-Université Laval. A survey on clinical practices in teleneuropsychology was conducted, from November 4th to December 16th, 2024, in several healthcare facilities in Quebec. A self-administered

questionnaire was developed to collect information on services delivery methods, patient selection criteria, tools used, perceived advantages and obstacles, as well as interest in potential implementation in settings not yet offering this service.

RESULTS

What is the effectiveness of teleneuropsychology?

The teleneuropsychology effectiveness was evaluated based on 6 systematic reviews and several studies conducted with pediatric (n = 13) and adult (n = 32) patients. The pediatric studies included one randomized controlled trial (RCT), as well as cross-sectional (n = 2), crossover (n = 3), and retrospective (n = 7) studies. The most frequent diagnoses among included children were autism spectrum disorders, specific learning disorders, and attention-deficit/hyperactivity disorders. One study focused specifically on children aged 5 years and younger. The results show that a wide variety of neuropsychological tests was used to assess intellectual functioning, learning, executive functions, attention, language, and visuospatial skills. Results generally indicate equivalence of scores between in-person and videoconference assessments, with statistically significant but clinically non significant differences for a few subtests. The reliability of scores across assessment methods ranged from moderate to excellent, depending on test and study, with generally high correlation coefficients. Inter-rater agreement was measured in three studies, and the results showed good concordance regardless of whether the tests were administered in person or remotely. Studies involving adults included one RCT, cross-sectional (n = 2), crossover (n = 26), and retrospective (n = 3) studies. Most reported conditions or diagnoses were confirmed or suspected cognitive impairments, Alzheimer's disease, and other dementias. Various neuropsychological tests were administered to assess several cognitive domains, including intellectual functioning, episodic and working memory, language, executive functions, information processing speed, visuospatial abilities, and praxis. Some tools have also been used to screen for specific pathologies, such as Alzheimer's disease. In general, the results indicate similar mean scores between the two administration methods (in-person and teleconsultation), although statistically significant differences were observed for some subtests, with small to moderate effect sizes. The scores obtained in both methods suggest moderate to excellent reliability for most of the tests.

The experience of patients, parents, caregivers and professionals in teleneuropsychology has been documented in 19 observational studies, 4 practice surveys, 2 patient experience surveys, and 1 RCT. These studies report high level of satisfaction among adult and pediatric patients, as well as parents, particularly regarding the convenience of virtual home visit, the ease of use of the tools, and the quality of interactions. Professionals are generally satisfied with remote modality, although they highlight some technical challenges (e.g., connection problems, audio/video quality) and environmental distractions that can affect the assessment process. These minor issues are reported in several studies. Overall, these results confirm the feasibility of teleneuropsychology for adult and pediatric patients. However, although all studies are comparative, their methodologies vary, each with its own advantages and limitations, including distinct groups versus same group assessed using two modalities, and biases related to the learning effect or the order of administration. Several contextual factors can also influence the results, such as the assessment setting (home versus clinic), the technological platform used, or the presence of a third party. Finally, the significant heterogeneity of the tests, populations, and assessment environments limits the generalizability of the results and calls for a cautious interpretation of the conclusions.

What are the risks associated with teleneuropsychology?

The impact of teleneuropsychology on patient safety was not reported in the selected studies.

What are the clinical practice recommendations from organizations and professional societies on teleneuropsychology?

Two practice guidelines and an experts' consensus on teleneuropsychology were identified. These publications define some criteria to guide the practice of teleneuropsychology. They specify the target population, informed consent procedures, data protection, patient safety, and criteria for conducting interviews and assessments. Currently, there are no official recommendations regarding which tests to prioritize in teleneuropsychology, and due to the lack of normative data specific to this practice, assessments must be based on established norms for in-person testing.

What are current practices related to neuropsychology and teleneuropsychology in Quebec health facilities?

According to the internal survey, neuropsychology services primarily include assessments, but also consultations and interventions, mostly in person. The CHU de Québec-Université Laval is a referral centre, with a significant proportion of requests originating from

outside the region. Services are primarily intended for patients with neuropsychological disorders of organic origin. According to the results of a survey of neuropsychologists from various healthcare facilities in Quebec, teleneuropsychology is mainly used for conducting initial interviews and communicating findings, while 32% of respondents administer psychometric tests remotely. These neuropsychologists highlight advantages such as saving time and increasing accessibility, but also limitations related to distractions from the patient's environment, varying levels of technological proficiency, and the lack of practice guidelines in many contexts. According to respondents from the CHU de Québec-Université Laval, the expansion of teleneuropsychology services would be facilitated by institutional support, clinicians' experience in telehealth, availability of secure computer equipment, and technical support. Obstacles remain, including uncertainties regarding test reliability, technological issues, confidentiality and informed consent, as well as factors related to patients, facilities, and the interpretation of result. Other challenges include unequal access to technology, a lack of guidelines and normative data for remote assessments, and the costs associated with purchasing digital psychometric tests.

What would be the impacts on organization and budget of modifying teleneuropsychology services at CHU de Québec-Université Laval?

The organizational and budgetary implications of teleneuropsychology remain poorly documented in the literature, particularly regarding incomplete testing, missed or avoided appointments, waiting times, and associated costs. Similarly, few original studies have compared test administration times across different modalities. The results of four studies conducted with adults show similar or slightly longer durations for teleconsultation, with differences ranging from two to seven minutes. These differences, while modest, are not explained by the authors and do not appear to significantly impact the feasibility of remote assessment. Environmental impact is also a significant factor to consider for teleconsultation services, but no data could be retrieved for this report.

DISCUSSION

- Despite some methodological limitations, the data support teleneuropsychology for assessing specific cognitive domains in children.
- Teleneuropsychology for adults: a viable alternative to in-person assessments despite some uncertainties.
- Teleneuropsychology: a widespread but heterogeneous service, highlighting the need for guidelines to implement the practice.

RECOMMENDATION

It is recommended to introduce the administration of psychometric tests into the practice of teleneuropsychology for pediatric and adult patients in CHU de Québec-Université Laval.

CONCLUSION

This report aimed to determine whether teleneuropsychology services should be standardized and expanded at the CHU de Québec-Université Laval for adult and pediatric patients. The analyzed data support the use of teleneuropsychology for administering psychometric tests to assess certain cognitive domains in both populations. The resulting recommendation also advocates a structured approach supported by clinical guidelines, rigorous monitoring, and standardization of practices, to promote sustainable implementation and improve the patient experience.

Publication :

https://www.chudequebec.ca/professionnels-de-la-sante/recherche-et-evaluation/evaluation-des-technologies-et-des-modes-d-interve/rapports-de-l-unite-d-evaluation-des-technologies/2025/evaluation-de-la-teleneuropsychologie-pour-la-clie.aspx