

Remote Cognitive Assessment of Older Adults in Rural Areas by Telemedicine and Automatic Speech & Video Analysis

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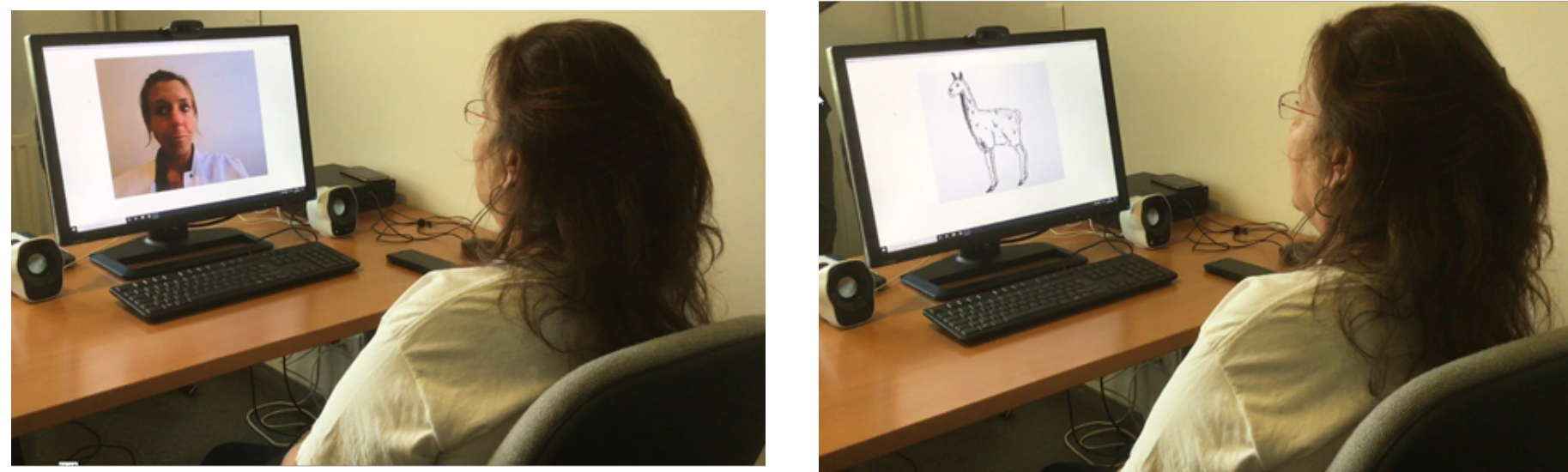
High agreement between face-to-face and video-conference-based administration method – Users expressed high acceptability – Audio and video features can be extracted and used for automatic behavior analysis of depressive symptoms

INTRODUCTION

In rural isolated areas or so called 'medical deserts', access to diagnosis and care is very limited. With the current pandemic crisis, now even more than ever, remote solutions such as telemedicine platforms represent great potential to solve this problem. Moreover, current advances made in voice and image analysis can help overcoming the barrier of the physical distance by providing additional information of a patients' emotional and cognitive state. The aim of this study is to evaluate the feasibility and reliability of a videoconference system for remote cognitive testing empowered by automatic speech and video analysis.

METHODS

50 participants (aged 55 and older) with and without cognitive impairment were recruited. A complete neuropsychological assessment including a short clinical interview were administered in two conditions, once by telemedicine and once by face-to-face. We designed a cross-over procedure. Acceptability and user experience were assessed among participants and clinicians in qualitative and quantitative manner. Speech and video features extracted and analyzed to obtain additional information on mood and engagement levels.



N	50		
Sexe			
Females, n (%)	33	(66%)	
Males, n (%)	17	(34%)	
Education			
Primary, n (%)	14	(28%)	
Secondary, n (%)	18	(36%)	
High, n (%)	18	(36%)	
			min max
Mean age,			
Years (SD)	73,32	(9,89)	40 86
Mean delay,			
Days (SD)	15,72	(3,43)	12 31

RESULTS

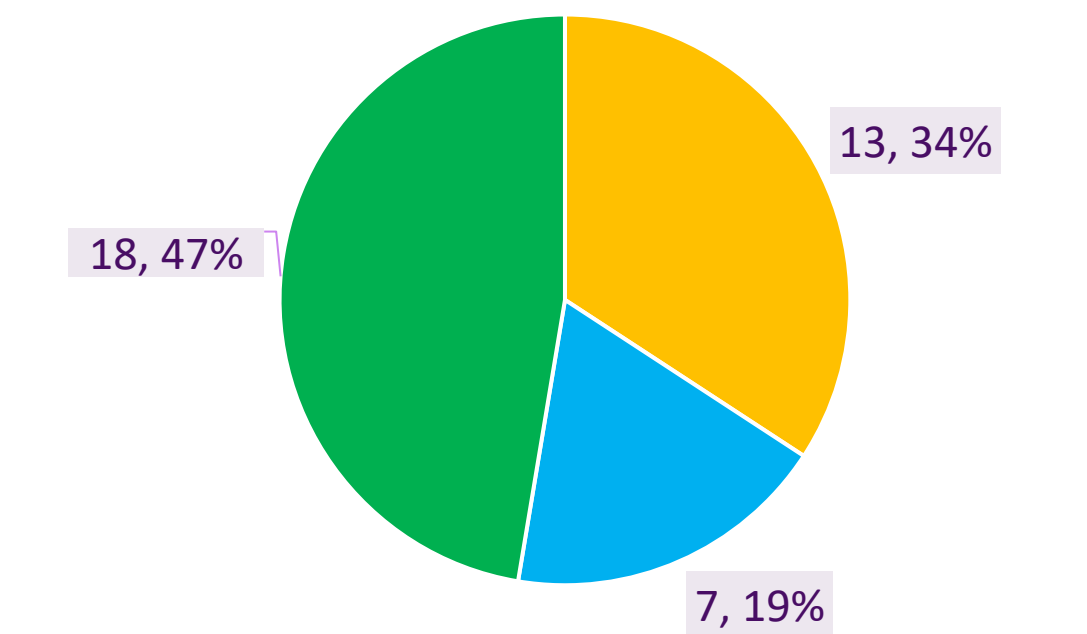
Significant agreements were found for most cognitive test between the remote and face-to-face administration method. Word recall ($r=0,928$) and picture naming task ($r=0,939$) showed the strongest correlation. Acceptability of the tool was relatively high with preference even in some cases for the remote method for more convenience.

Cognitive tests		ICC
MMSE	Total score	***
	Total Recall	***
FCSRT	Delayed recall	*
	Recognition	ns
Lexis (naming task)	Total score	***
	Colors	***
STROOP	Reading	**
	Inhibition	***
Fluence verbale	Semantic	ns
	Phonological	***
Praxis	Total score	***

* p 0,05 ; ** p <0,01; *** p < 0,001

Which method of assessment do you prefer, face-to-face or by video conference ?

■ Face-to-Face ■ VC ■ Both



« rather pleasantly surprised puts a distance which is rather facilitating »

CONCLUSIONS

Results support the feasibility and reliability of remote cognitive testing through administration via a telemedicine tool. These systems can be used for remote disease monitoring, enabling patients to be assessed in their own homes and improve utilization of expert assessors allowing them to conduct neurocognitive testing remotely. Speech and video features are additionally extractable for behavior analysis

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