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Telephone administration of the Yesavage depression scale in older adults: a proof-of-concept study

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Abstract

Introduction: You have at least 20% odds of experiencing depression sometime in your life. It is a condition that will probably affect your psychological and physical well-being. This worsens if you expect to be over 65 years old by 2030. Fortunately, depression can be treated, and the sooner, the better. Yet, the presence of depressive symptoms is not systematically assessed, leading to underdiagnosis and inadequate treatment. Therefore, it is urgent to create easily applicable screening tools. This study compares the Yesavage depression scale administered for the first time via telephone with the traditional in-office administration. **Methods:** Older adults diagnosed with mild cognitive impairment were prospectively selected. The Yesavage test was administered in person and via telephone, and the association between both measures was calculated at baseline (To). The procedure was repeated after 6 months (T1). **Results:** A total of 57 individuals were analyzed at To, and 37 individuals were analyzed at T1. Correlation analysis showed statistically significant relationships between in-person and telephone administrations for both To ($r = 0.78$, $p = 0.0000$) and T1 ($r = 0.77$, $p = 0.000$). **Conclusions:** Our findings provide preliminary evidence supporting the Yesavage test as a useful, easy-to-implement tool for telephone-based depression screening in older adults with mild cognitive impairment.

Keywords: depression, mild cognitive impairment, dementia, Yesavage scale, geriatric depression scale, older adults, remote screening

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1. Introduction

Depression is a prevalent mental health disorder that can impact anyone [1] but disproportionately affects older adults. Recent data estimate that approximately one in three individuals over the age of 65 experience clinically significant depressive symptoms [2, 3]. This prevalence is projected to continue increasing [4] and is markedly higher among institutionalized populations, with a recent meta-analysis reporting rates exceeding 50% in nursing home residents [5].

The burden of depression is exacerbated among those with chronic or acute medical comorbidities. For instance, depression affects approximately 26% of individuals following myocardial infarction and 23% of stroke survivors [6]. These comorbidities not only worsen mental health outcomes but also contribute to increased healthcare utilization, functional decline, and mortality [7].

Depression in older adults is characterized by a constellation of affective, cognitive, and somatic symptoms, including anhedonia, apathy, irritability, lethargy, and subjective distress. However, it remains both underdiagnosed and undertreated in this population, often due to the misconception that depressive symptoms are a normal part of aging or overlap with other geriatric syndromes [8, 9].

Importantly, depression is associated with cognitive impairment. Evidence shows a bidirectional relationship between depressive symptoms and mild cognitive impairment (MCI), with depression increasing the risk of conversion to Alzheimer's disease [10]. Furthermore, depression itself may accelerate neurodegenerative processes and exacerbate disability, further threatening independence and quality of life [11, 12].

Despite being treatable [13], less than 25% of older adults have access to effective treatment according to the WHO. This problem is expected to worsen, with depression projected to become the leading cause of disability-adjusted life years (DALYs) by 2030 [14]. Thus, early detection and screening are critical for healthcare systems and society.

Treatment involves both pharmacological and non-pharmacological approaches (e.g., psychotherapy) [15] and requires timely identification of depressive symptoms [16]. Nonetheless, depression is not systematically evaluated in routine care, often being suspected only through nonspecific observation. For instance, pathological changes are diagnosed by the duration of the clinical presentation, its severity, and the degree of functional and social impairment caused by its symptoms.

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Standardized diagnostic criteria, such as the “Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5[®])” and the “International Classification of Diseases, 10th edition (ICD-10)”, have been widely implemented for adults [17, 18]. But the criteria used to diagnose depression in older adults should be different than those used in younger patients because older adults frequently present atypical or incomplete symptoms - often not meeting the criteria of DSM-5 and ICD-10, tend not to spontaneously seek help for depressive symptoms, or these symptoms are mistakenly attributed to aspects of aging, ultimately leading to underdiagnosis [19, 20]. Fortunately, several instruments exist for screening depression in older adults. One of the most widely used tools is the Geriatric Depression Scale by Yesavage, which has been validated and translated into various languages (also known as the GDS or Yesavage scale). The original version was developed by Brink and Yesavage in 1982 [20] and consisted of 30 “yes–no” format questions. In 1986, Sheikh and Yesavage developed a shortened version with 15 questions, which facilitates administration while retaining accuracy [21]. Even though its usage requires an in-person interview, the scale has proven simple, quick, and effective for large populations [22].

After the recent pandemic, and considering current technological advancements, telemedicine and remote assessments are increasingly recommended to complement in-person care [23]. Remote screening is particularly relevant for older adults facing physical and/or economic barriers to care. While the Yesavage scale has been widely used in traditional clinical settings, it has not yet been formally evaluated for telephone administration.

This study aims to provide a proof of concept for the telephone administration of the Yesavage scale in older adults with MCI, addressing the broader need for accessible remote screening tools and preliminary evidence for concurrent validity, to improve the treatment and prognosis for these patients [24].

2. Materials and methods

2.1. Design and population

A prospective cohort study was conducted using data from a subset of a larger research project investigating a computerized stimulation platform for older adults with MCI.

Participants were treated at the Neurocognitive Unit of the Hospital Privado de Comunidad, Mar del Plata, Argentina, between October 2020 and October 2022. Inclusion criteria comprised aged ≥ 65 years and diagnosed with MCI per Petersen criteria [10], which include the following:

- A. Complaint of memory loss confirmed by an informant.
- B. Objective memory impairment relative to peers.
- C. Normal global cognitive function (i.e., normality in activities of daily living and absence of dementia).

Exclusion criteria included the following:

1. History of dementia or suspicion of dementia after the initial evaluation.
2. Previous diagnosis of major depression or other chronic psychiatric disorders (psychosis and substance addiction),

active neoplasms, severe cardiac diseases, severe chronic renal failure, or decompensated type II diabetes.

3. Sensory or motor deficits that hinder evaluation (severe hearing loss, severe vision impairment, speech difficulties, etc.).
4. Functional illiteracy.
5. Moderate or severe recent traumatic brain injury.
6. Any focal neurological lesion of vascular, tumoral, and/or infectious origin that, according to the evaluators, could explain the cognitive impairment.
7. Refusal to sign the informed consent form.

These exclusion criteria were selected considering that some of these conditions may be associated with conditions that resemble MCI but are not primarily degenerative, having instead diverse pathophysiology and clinical presentations. The aim was to homogenize the sample so that the included patients had a pattern of MCI more likely associated with degenerative causes rather than psychiatric, tumoral, or other causes.

Participants underwent a battery of neurocognitive tests for recruitment and baseline characterization.

2.2. Instrument

Depressive symptoms were assessed using the Spanish GDS short form. It consists of 15 “yes–no” questions that can take a value of 1 or 0, adding up to score from 0 to 15 (**Table 1**). A score of ≥ 6 suggests depression, with a reported sensitivity and specificity of 80–95%, depending on the population [22].

2.3. Procedures

The Yesavage scale was administered to all patients in a traditional face-to-face setting as part of an initial cognitive evaluation (referred to as To in-person). Approximately 30 days later, a blinded and different researcher administered the same scale over the phone (To remote). The decision to collect data around the 30-day mark instead of immediately was made because the patients had to undergo an intervention during that time, and it was not feasible nor ethical to burden them with additional activities within the larger study. For participants who remained in the study, the procedure was repeated at 6 months via telephone (T1 remote) and in person (T1 in-person), with approximately 15 days between assessments. It should be noted that the intervention involved the use of a computerized gaming platform, and we do not expect it to affect the reporting of depressive symptoms.

2.4. Statistical analysis

Descriptive analysis includes frequencies, percentages, means, and standard deviations for categorical and normally distributed interval variables. Correlation analyses were conducted to quantify the relationship between the final scores on the Yesavage test in the in-person versus remote assessments at To and T1 independently, with $p < 0.05$ considered significant. Analyses were conducted in Stata 14 and Matlab R2020a.

Table 1 • Yesavage test.

Questions	No	Yes
Are you basically satisfied with your life?	1	0
Have you given up many activities and hobbies?	0	1
Do you feel that your life is empty?	0	1
Do you often feel bored?	0	1
Do you feel joyful and optimistic, in good spirits most of the time?	1	0
Do you fear that something bad is going to happen to you?	0	1
Do you feel happy and content most of the time?	1	0
Do you often feel helpless, hopeless, or indecisive?	0	1
Do you prefer staying at home rather than going out and doing new things?	0	1
Do you think you have more memory problems than others?	0	1
Do you think it is pleasant to be alive?	1	0
Do you have difficulty starting new projects?	0	1
Do you feel full of energy?	1	0
Do you feel that your situation is distressing or desperate?	0	1
Do you believe that most people are financially better off than you?	0	1

Total Score: 0–5 Normal. 6–9 Mild depression. >10 Established depression. All items that add a point appear completed with ‘1’. If a patient completed this way, s/he would have the maximum score (i.e., total score = 15).

3. Results

The To sample comprised 57 participants (18 males), aged 65–86 years old (mean = 76.4, SD = 5.5). The group analyzed at T1 was

a subset of the previous sample. Since recruitment was conducted in stages, the number of patients who had reached this stage at the time of this study was smaller. T1 included 31 participants (14 males), aged 66–86 years old (mean = 77.1, SD = 5.1). **Table 2.**

Table 2 • Characteristics of the patient sample at To and T1.

Variable	Group To (n = 57) mean (SD)/%	Group T1 (n = 37) mean (SD)/%
Age in years	76.4 (5.5)	77.1 (5.2)
Female gender	68.4%	62.2%
Formal education in years	11.0 (4.6)	10.2 (4.5)
Marital status (%)		
married/in a relationship	49.1%	46.0%
widowed	45.6%	48.7%
divorced	5.3%	5.4%
Occupation (%)		
employed	19.3%	15.6%
retired	80.7%	84.4%
MoCA raw score	21.7 (2.9)	21.8 (3.3)
pz MoCA	0.06 (0.9)	0.36 (1.04)
In-person Yesavage score	3.95 (2.4)	3.94 (2.28)
Remote Yesavage score	4 (2.4)	4.02 (2.31)
Days between remote and in-person testing	33.1 (16.9)	15.5 (12.4)
Diagnosis of minor depression	28%	25%
Taking antidepressant medication	33.3%	25%
Diagnosis of hypertension	65.4%	68.65%
Diagnosis of diabetes mellitus	19.2%	25%

References: SD: standard deviation. MoCA: Montreal cognitive assessment.

To quantify the relationship between the in-person and telephone methods, one correlation analysis was conducted for T0 (**Figure 1**) and another for T1 (**Figure 2**). Both correlation analyses showed statistically significant associations between in-person

and telephone administrations: $r = 0.78$, $p = 0.0000$ for T0 and $r = 0.77$, $p = 0.0000$ for T1.

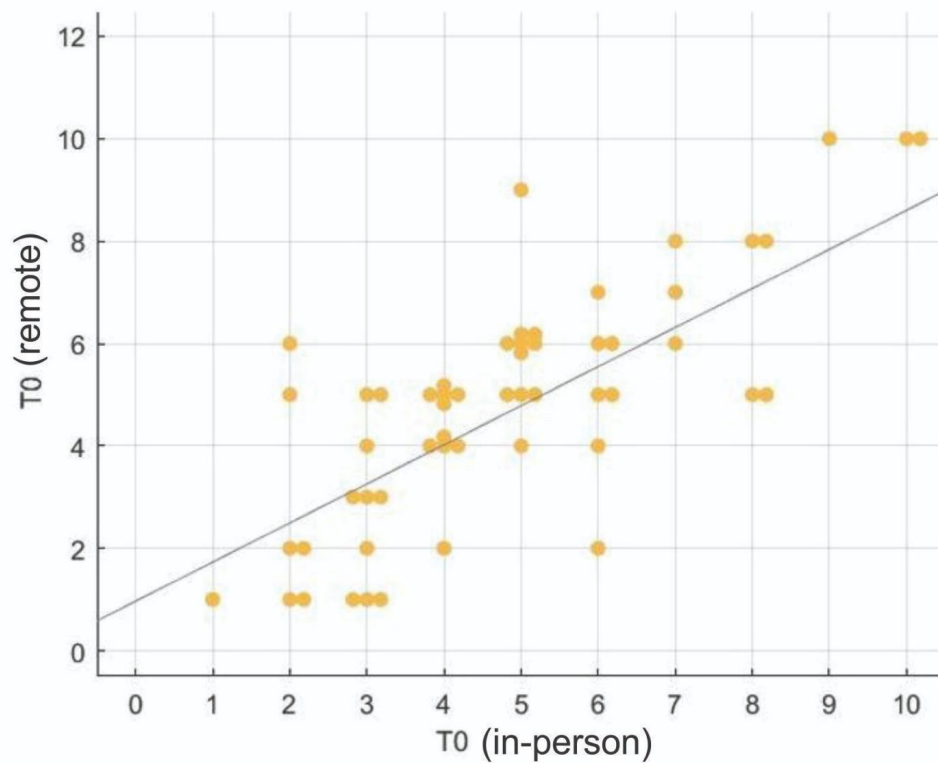


Figure 1 • Scatter plot of in-person Yesavage T0 scores versus telephone Yesavage T0 scores. Each dot depicts the values for one person.

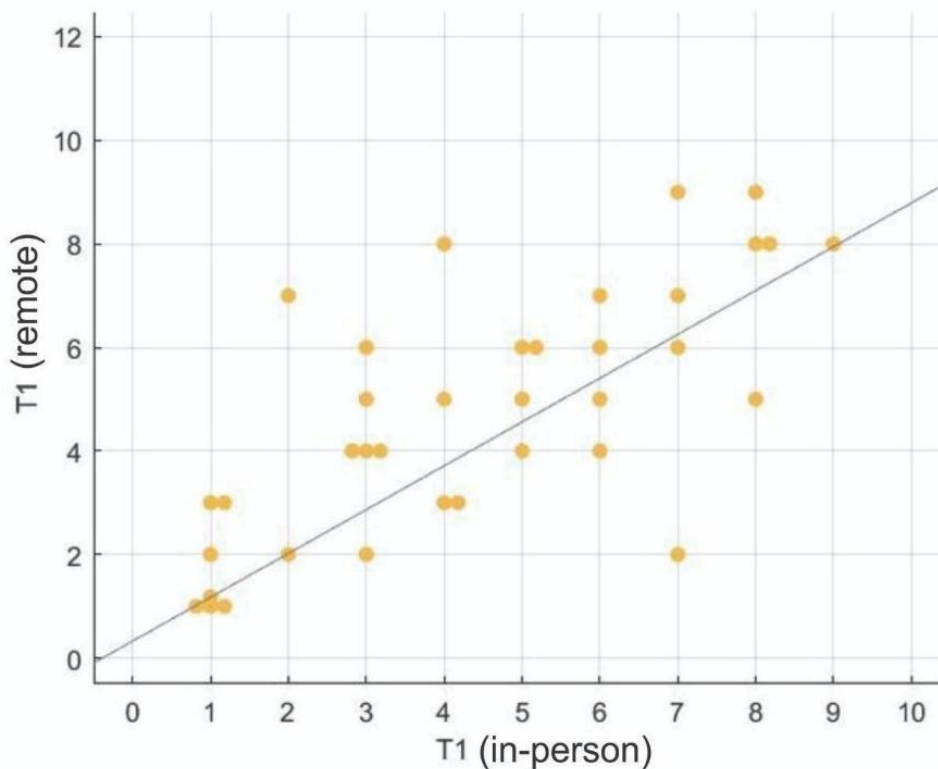


Figure 2 • Scatter plot of telephone Yesavage T1 scores versus in-person Yesavage T1 scores. Each dot depicts the values for one person.

4. Discussion

This study demonstrates that telephone administration of the Yesavage scale shows a strong correlation with traditional in-person administration at the outpatient clinic visit, providing a proof of concept for remote use in older adults with MCI. It is worth noting that correlations remained significant at two different time points, separated by 6 months.

In medical practice, the estimated waiting times for consultations with mental health/neurology professionals and the initiation of antidepressant treatments usually exceed one month, not considering the additional delay in the onset of their effects. Therefore, we believe it is essential to pursue research aimed at finding easily applicable and high-impact tools to improve healthcare opportunities for the elderly population.

Time intervals between assessments were 33.1 (SD 16.9) days for T0 and 15.5 (SD 12.4) days for T1, consistent with clinical knowledge that depressive symptoms persist for at least two weeks and often last longer in the absence of appropriate treatment. In this study, there were no interventions aimed at treating depression, so if there were any potential biases or confounders that could have influenced symptom reporting at the 30-day mark, they should have been distributed equally among all studied patients. However, the 6-month interval between T0 and T1 might be sufficient for depressive symptoms to change, thereby affecting the test results. Therefore, it did not make sense to correlate these two values.

Early recognition and treatment of depression in older adults is essential for improving outcomes and reducing the healthcare burden due to its prevalence, disability, and impact on quality of life. Our findings indicate that the Yesavage scale can be administered remotely with minimal training, offering a practical solution for populations facing barriers to in-person assessment.

Future studies could evaluate broader populations of older adults (e.g., without cognitive complaints and patients with dementia) to extend these findings. While this study is limited by sample size, it provides initial evidence supporting the feasibility and concurrent validity of the telephone-administered Yesavage scale.

5. Conclusions

The Yesavage scale is a practical and easily administered screening tool for depression in older adults. Telephone administration yields results that are strongly correlated with in-person assessment, supporting its use as a remote screening method in daily clinical practice. Our findings are particularly relevant for populations that are often frail and face barriers to accessing healthcare, such as economic constraints or health conditions that limit travel to healthcare centers. We have shown that the scale can be administered by both specialized and non-specialized professionals, enabling faster, broader detection of depression and timely treatment in older adults, ultimately improving equity for this vulnerable population and contributing to a more just society.

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Author contributions

Conceptualization, M.E.C., P.I., and A.P.G.; methodology, M.E.C., F.P., and A.P.G.; investigation, M.E.C., F.P., A.B., and J.F.; formal analysis, D.E.S.; writing—original draft, M.E.C., A.B., and A.P.G.; funding acquisition, M.E.C. and A.P.G. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

Andrea Paula Goldin is a Fellow of Learning Sciences Exchange, a joint project of New America and the Jacobs Foundation. Diego E. Shalom and Andrea Paula Goldin are funded by the National Council of Scientific and Technical Research of Argentina (CONICET). María Emilia Clément and Pablo Ioli are funded by Hospital Privado de Comunidad (HPC). The sponsors played no role in the conception, execution, interpretation, or writing of this manuscript.

Data availability statement

The data supporting the findings of this publication can be made available upon request.

Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee of the Medical Foundation of Mar del Plata, CIREI: Institutional Council of Research Studies (Solicitant: María Emilia Clément; Project name: “Validación telefónica de Escala de Yesavage para su utilización remota”; date of approval 2023 Jun 2).

Informed consent statement

Informed consent for participation was obtained from all subjects involved in the study.

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