World Journal of AIDS, 2026, 16(3), 75-85
https://www.scirp.org/journal/wja
ISSN Online: 2160-8822
ISSN Print: 2160-8814

Montreal Cognitive Assessment Scores and Associated Factors among Adults Living with HIV in Mexico: A Cross-Sectional Study

Jaime Arturo Ruiz Escamilla[1*], Raúl Melo Acevedo[2], José Juan García González[3]

[1]Department of Geriatrics, Hospital General de Zona No. 20, Instituto Mexicano del Seguro Social Puebla, Puebla, Mexico
[2]Department of Internal Medicine, Hospital General Regional No. 1, Instituto Mexicano del Seguro Social Querétaro, Querétaro, Mexico
[3]Department of Geriatrics, Hospital General Regional No. 1, Instituto Mexicano del Seguro Social Querétaro, Querétaro, Mexico
Email: *arturo202317@gmail.com, rma24@hotmail.com

How to cite this paper: Ruiz Escamilla, J.A., Melo Acevedo, R. and García González, J.J. (2026) Montreal Cognitive Assessment Scores and Associated Factors among Adults Living with HIV in Mexico: A Cross-Sectional Study. *World Journal of AIDS*, **16**, 75-85.
https://doi.org/10.4236/wja.2026.163006

Received: July 31, 2026
Accepted: August 29, 2026
Published: September 1, 2026

Abstract

Background: The Montreal Cognitive Assessment (MoCA) is frequently used for cognitive screening, but a fixed cutoff cannot establish HIV-associated neurocognitive disorder and may perform differently across demographic and cultural settings. We described MoCA scores obtained during the study and examined factors associated with lower scores among adults receiving HIV care in Mexico. **Methods:** This analytical cross-sectional study included 242 adults with confirmed HIV infection who received outpatient care in Querétaro, Mexico, during 2021. Participants were enrolled through consecutive non-probability sampling as they attended consultations. MoCA was administered once after consent and enrollment, and the total score was analyzed as a continuous outcome. Multivariable linear regression with HC3 robust standard errors included age, schooling of 12 years or less, and AIDS at initial diagnosis as prespecified covariates. **Results:** Median age was 31 years, 96.3% of participants were male, and 94.3% of those with interpretable viral-load data had 50 copies/mL or less or an undetectable result. The median MoCA score was 26 (interquartile range, 24 - 28; range, 15 - 30); 114 participants (47.1%) scored below 26. In the primary model (n = 191), age (beta = −0.020 points/year; 95% CI, −0.071 to 0.032), schooling of 12 years or less (beta = −0.687; 95% CI, −1.963 to 0.589), and AIDS at initial diagnosis (beta = −0.445; 95% CI, −1.306 to 0.417) were not clearly associated with MoCA score. **Conclusion:** No factor demonstrated a robust independent association with MoCA performance in the primary model. The percentage scoring below 26 should not be interpreted as the prevalence of a neurocognitive disorder. Population-appropriate norms, functional assessment, comprehensive neuropsychological testing, and systematic

measurement of relevant confounders are required for diagnostic inference.

Keywords

HIV, Montreal Cognitive Assessment, Cognitive Screening, Neurocognitive Performance, Mexico, Cross-Sectional Study

1. Introduction

Combination antiretroviral therapy has substantially improved survival among people with HIV. Cognitive symptoms and lower neuropsychological performance nevertheless remain clinically relevant in some individuals, although estimates vary markedly according to the population studied, the tests and normative standards used, the handling of comorbidities, and the diagnostic framework applied [1]-[3]. In modern cohorts with effective treatment, attributing cognitive difficulties specifically to HIV is challenging because mood disorders, substance use, sleep disturbance, vascular risk, coinfections, socioeconomic conditions, and educational opportunity can also influence performance.

The Montreal Cognitive Assessment (MoCA) is a brief screening instrument that samples several cognitive tasks. It does not establish a diagnosis of HIV-associated neurocognitive disorder (HAND), and its diagnostic performance among people with HIV varies across settings and cutoffs [4] [5]. A formal neurocognitive diagnosis requires more extensive neuropsychological assessment, evaluation of everyday functioning, and consideration of alternative explanations [3]. Consequently, a single fixed MoCA threshold may misclassify individuals when demographic and cultural factors are not adequately considered.

The Spanish-language MoCA has been validated in Mexico, but the original Mexican validation focused primarily on older adults evaluated for mild cognitive impairment or dementia [6]. More recent regression-based normative data in Mexican adults demonstrate substantial effects of age and education and favor demographic adjustment over universal cutoffs [7]. These considerations are particularly important in a young and socially heterogeneous HIV clinic population.

The objective of this study was to describe the distribution of MoCA scores obtained during the study and evaluate prespecified sociodemographic and HIV-related factors associated with lower scores among adults with HIV attending a specialized clinic in Mexico. The analysis intentionally treated MoCA as a continuous screening measure rather than defining a neurocognitive disorder from a fixed threshold.

2. Methods

2.1. Study Design and Setting

This analytical cross-sectional study was conducted at a specialized outpatient

HIV clinic in Querétaro, Mexico. The analytic dataset comprised adults receiving care between January and December 2021. Cognitive assessment was performed prospectively during the study period after enrollment and written informed consent, whereas clinical and laboratory variables were obtained from the available medical records. This report was prepared in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement [8].

2.2. Participants and Recruitment

Eligible participants were 18 years or older, had confirmed HIV infection, and provided written informed consent. Exclusion criteria were a recorded history of neurological or systemic conditions considered likely to independently and substantially affect cognitive testing, including cerebral toxoplasmosis, cryptococcal meningitis, central nervous system lymphoma, HIV encephalopathy, progressive multifocal leukoencephalopathy, previous stroke, severe hearing impairment, or complete blindness.

Participants were enrolled consecutively as they attended outpatient consultations during the study period, provided that they met the eligibility criteria and agreed to participate. No random selection was performed; the recruitment strategy was therefore consecutive non-probability sampling. All enrolled individuals in the study database who met the eligibility criteria and had a recorded MoCA score were included. The database did not contain the total number approached or screened, the number who declined participation, or detailed reasons for non-enrollment; consequently, a participation fraction and complete recruitment flow diagram could not be reconstructed. The available analytic sample determined the study size, and no formal sample-size calculation was performed.

2.3. Cognitive Assessment

Cognitive screening was performed using the Mexican Spanish-language MoCA [6] [9]. Each participant underwent a single MoCA assessment after providing written informed consent and enrolling in the study. No participant underwent more than one MoCA assessment during the study period; therefore, no selection among repeated assessments was required. The primary outcome was the total MoCA score obtained during the study assessment, ranging from 0 to 30, analyzed as a continuous variable. The dataset contained the final total score but not item-level responses, examiner certification information, or documentation confirming whether the standard educational correction had been applied. No retrospective score correction was performed.

For comparison with the original protocol and previous literature, the number of participants with a score below 26 was also summarized. This threshold analysis was explicitly descriptive: a score below 26 was not labeled neurocognitive impairment, was not interpreted as a diagnosis of HAND, and was not used to estimate the prevalence of a pathological condition.

2.4. Clinical and Demographic Variables

Available variables included age, sex, schooling categorized as more than 12 years versus 12 years or less, occupation, time since HIV diagnosis, body mass index, hemoglobin concentration, recorded comorbidities, antiretroviral regimen class, current plasma HIV viral load, $CD4^+$ T-cell count at diagnosis, current $CD4^+$ T-cell count, and the clinical-immunological category documented at initial HIV diagnosis.

The clinical-immunological category used in this study was the category documented at the time of the initial HIV diagnosis and was analyzed as a baseline historical characteristic rather than current disease status; it was not reconstructed from subsequent clinical status. AIDS at initial diagnosis was defined from this recorded category as A3, B3, C1, C2, or C3. Categories A1, A2, B1, and B2 were classified as not meeting this definition. Records stating that the initial category was unknown were retained as missing in the primary analysis. For laboratory variables, the most recent value available at the time of the MoCA assessment was used, and no laboratory value was more than 3 months old. Current viral load was classified as greater than 50 copies/mL versus 50 copies/mL or less/undetectable when interpretable. One $CD4^+$ T-cell value at diagnosis of 212,349 cells/mm^3 was considered biologically implausible and treated as missing.

Comorbidity status was abstracted from the medical record. Recorded conditions included latent tuberculosis, hepatitis B or C, hypertension, diabetes, chronic kidney disease, asthma, hypothyroidism, schizophrenia, ankylosing spondylitis, anal cancer, and lymphoma; several entries indicated a comorbidity without specifying the diagnosis. Depression, anxiety, sleep disorders, active substance use, syphilis, and other potential cognitive confounders were not systematically measured with standardized instruments.

2.5. Statistical Analysis

Categorical variables were summarized as counts and percentages using the number with available data as the denominator. Continuous variables were summarized as medians and interquartile ranges because several distributions were non-normal.

The primary inferential analysis modeled total MoCA score as a continuous outcome using ordinary least-squares linear regression with HC3 heteroscedasticity-consistent standard errors. Age, schooling of 12 years or less, and AIDS at initial diagnosis were selected a priori rather than through significance testing. Age and education were included because they are established determinants of MoCA performance, and AIDS at diagnosis represented the principal HIV-related hypothesis. The primary model used complete cases for these variables. Missing values were not imputed.

To evaluate whether complete-case exclusion might have influenced the primary-model estimates, participants with known versus unknown AIDS status at initial diagnosis were compared on age and MoCA score using Mann-Whitney U tests and on schooling category using Fisher's exact test.

Sensitivity analyses included 1) a model retaining unknown AIDS status as a separate category to include all participants, 2) median regression because the MoCA distribution was bounded and left-skewed, and 3) logistic regression using the historical score threshold below 26 solely for comparison with the original analysis. The functional form of age was additionally assessed using a natural cubic spline with 3 degrees of freedom and by comparing the spline specification with the linear age specification. Model diagnostics included variance inflation factors, the Breusch-Pagan test, Ramsey's regression specification error test, residual inspection, and Cook's distance. For the influential-observation sensitivity analysis, the primary model was refitted after excluding observations with Cook's distance greater than 4/n. Results are reported as beta coefficients or odds ratios with 95% confidence intervals. Two-sided P values below 0.05 were considered statistically significant, but interpretation emphasized effect estimates and confidence intervals. Analyses were performed using Python 3.13, pandas 2.2.3, and statsmodels 0.14.6.

2.6. Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and applicable Mexican regulations for health research. The relevant institutional bioethics committee approved the protocol, and all participants provided written informed consent before enrollment. Identifying committee details and the approval number are provided on the separate title page.

3. Results

3.1. Participant Characteristics and Data Completeness

A total of 242 participants were included. Median age was 31 years (interquartile range [IQR], 28 - 38), 233 participants (96.3%) were male, and 207 (85.5%) had more than 12 years of schooling. Median time since HIV diagnosis was 4 years (IQR, 2 - 7). Among participants with an interpretable current viral load, 216 of 229 (94.3%) had 50 copies/mL or less or an undetectable result. The median current $CD4^+$ T-cell count was 518 cells/mm3 (IQR, 356 - 714; n = 200), and 240 participants (99.2%) were receiving an integrase strand transfer inhibitor-based regimen.

Initial AIDS status was unavailable for 51 participants (21.1%). Among the 191 participants with a known initial category, 64 (33.5%) met the study definition of AIDS at diagnosis. $CD4^+$ T-cell count at diagnosis was available and plausible for 170 participants, current $CD4^+$ T-cell count for 200, current viral-load status for 229, and hemoglobin for 239. Table 1 summarizes the cohort and analytic denominators.

Participants with unknown AIDS status at initial diagnosis (n = 51) were slightly older than those with known status (median, 34 [IQR, 28 - 40] vs 31 [IQR, 28 - 37] years; P = 0.045). MoCA scores were similar between groups (median, 25 [IQR, 24 - 27] vs 26 [IQR, 24 - 28]; P = 0.750), as was the proportion with 12 years or less of schooling (6/51 [11.8%] vs 29/191 [15.2%]; P = 0.657).

Table 1. Characteristics of the study population.

Characteristic	Available n	Value	Missing n
MoCA total score	242	26 (24 - 28)	0
MoCA score < 26 (descriptive threshold)	242	114 (47.1%)	0
Age, years	242	31 (28 - 38)	0
Female sex	242	9 (3.7%)	0
Schooling ≤ 12 years	242	35 (14.5%)	0
Employee occupation	242	177 (73.1%)	0
Time since HIV diagnosis, years	242	4 (2 - 7)	0
Body mass index, kg/m^2	242	26.1 (23.8 - 28.7)	0
Any recorded comorbidity	240	18 (7.5%)	2
AIDS at initial diagnosis	191	64 (33.5%)	51
Current viral load > 50 copies/mL	229	13 (5.7%)	13
CD4$^+$ T-cell count at diagnosis, cells/mm^3	170	300 (155 - 497)	72
Current CD4$^+$ T-cell count, cells/mm^3	200	518 (356 - 714)	42
Hemoglobin, g/dL	239	16.3 (15.7 - 17.0)	3
Current INSTI-based ART	242	240 (99.2%)	0

Values are median (interquartile range) or n (%). Percentages use available data as the denominator. The score < 26 threshold is descriptive and does not define a neurocognitive disorder. One biologically implausible CD4$^+$ T-cell count at diagnosis was set to missing. ART indicates antiretroviral therapy; INSTI, integrase strand transfer inhibitor; MoCA, Montreal Cognitive Assessment.

3.2. Distribution of MoCA Scores

The median MoCA score obtained during the study assessment was 26 (IQR, 24 - 28), the mean was 25.6 (standard deviation, 2.7), and scores ranged from 15 to 30. A total of 114 participants (47.1%) scored below 26. This proportion describes performance relative to a historical threshold and does not represent the prevalence of HAND or another clinical neurocognitive disorder.

3.3. Factors Associated with MoCA Score

In univariable linear regression, older age was associated with a modestly lower MoCA score (beta = −0.047 points per year; 95% CI, −0.087 to −0.008; P = 0.019). Schooling of 12 years or less was associated with an estimated 0.95-point lower score, although the confidence interval included no difference (beta = −0.948; 95% CI, −2.007 to 0.111; P = 0.079). AIDS at initial diagnosis was associated with an estimated 0.56-point lower score in the subset with known initial category (beta = −0.560; 95% CI, −1.395 to 0.274; P = 0.188). No clear univariable association was observed for sex, duration of HIV, recorded comorbidity, body mass index, hemoglobin, or current viral load greater than 50 copies/mL (Table 2).

Table 2. Univariable and primary multivariable linear regression of total MoCA score.

Variable	n	Univariable estimate	Adjusted estimate
Age, per year	242	−0.047 (−0.087 to −0.008); P = 0.019	−0.020 (−0.071 to 0.032); P = 0.458
Schooling ≤ 12 years	242	−0.948 (−2.007 to 0.111); P = 0.079	−0.687 (−1.963 to 0.589); P = 0.291
AIDS at initial diagnosis	191	−0.560 (−1.395 to 0.274); P = 0.188	−0.445 (−1.306 to 0.417); P = 0.312
Female sex	242	−1.268 (−3.591 to 1.056); P = 0.285	-
HIV duration, per year	242	−0.004 (−0.101 to 0.093); P = 0.936	-
Any recorded comorbidity	240	−0.492 (−1.852 to 0.867); P = 0.478	-
Current viral load > 50 copies/mL	229	−0.045 (−1.271 to 1.181); P = 0.943	-
BMI, per kg/m^2	242	0.005 (−0.087 to 0.096); P = 0.922	-
Hemoglobin, per g/dL	239	−0.072 (−0.322 to 0.178); P = 0.572	-

Estimates are beta coefficients (95% confidence intervals) and represent the mean difference in MoCA points per unit or category. The adjusted model included age, schooling ≤ 12 years, and AIDS at initial diagnosis and used complete cases (n = 191). HC3 robust standard errors were used. BMI indicates body mass index; MoCA, Montreal Cognitive Assessment.

The primary multivariable model included 191 complete cases. After adjustment, age (beta = −0.020; 95% CI, −0.071 to 0.032; P = 0.458), schooling of 12 years or less (beta = −0.687; 95% CI, −1.963 to 0.589; P = 0.291), and AIDS at initial diagnosis (beta = −0.445; 95% CI, −1.306 to 0.417; P = 0.312) were not clearly associated with MoCA score. The model explained little outcome variation (R^2 = 0.020; adjusted R^2 = 0.005). Predictor variance inflation factors were low (maximum, 1.06), and there was no evidence of heteroscedasticity by the Breusch-Pagan test (P = 0.551) or major specification error by Ramsey's test (P = 0.237).

3.4. Sensitivity Analyses

In the sensitivity model retaining unknown AIDS status as a category (n = 242), age was associated with a small decrease in score (beta = −0.045 per year; 95% CI, −0.086 to −0.004; P = 0.031), whereas schooling of 12 years or less (beta = −0.917; 95% CI, −2.011 to 0.177; P = 0.100), AIDS at diagnosis (beta = −0.331; 95% CI, −1.183 to 0.522; P = 0.447), and unknown AIDS status (beta = 0.022; 95% CI, −0.789 to 0.832; P = 0.958) were not clearly associated (Table 3). The age estimate

Table 3. Sensitivity analysis retaining unknown AIDS status as a separate category (n = 242).

Variable	Beta	95% CI	P value
Age, per year	−0.045	−0.086 to −0.004	0.031
Schooling < = 12 years	−0.917	−2.011 to 0.177	0.100
AIDS at initial diagnosis	−0.331	−1.183 to 0.522	0.447
Unknown AIDS status	0.022	−0.789 to 0.832	0.958

The reference category for AIDS status was no AIDS at initial diagnosis. HC3 robust standard errors were used.

in the full-sample model was modestly more negative than in the complete-case model (beta = −0.020; 95% CI, −0.071 to 0.032), and the confidence intervals overlapped substantially.

A natural cubic spline with 3 degrees of freedom did not improve model fit compared with a linear age specification in the complete-case model (P = 0.846 for the nonlinear component) or the full-sample model (P = 0.853). Descriptively, mean MoCA scores declined across age groups: 26.13 at 18 - 29 years, 25.39 at 30 - 39 years, and 24.73 at 40 years or older. These findings supported retaining age as a continuous linear term in the primary model.

Median regression and the influential-observation analysis yielded estimates consistent with the overall interpretation (Table 4). Fourteen observations had Cook's distance greater than 4/n; after their exclusion, 177 participants remained. The historical-threshold logistic model reproduced the original adjusted estimate for AIDS at diagnosis (adjusted odds ratio, 1.77; 95% CI, 0.94 - 3.32; P = 0.075), which was treated only as a sensitivity analysis.

Table 4. Median-regression and influential-observation sensitivity analyses.

Variable	Median regression beta (95% CI), n = 191	After excluding influential observations beta (95% CI), n = 177
Age, per year	0.000 (−0.062 to 0.062)	−0.004 (−0.046 to 0.038)
Schooling ≤ 12 years	0.000 (−1.360 to 1.360)	−0.205 (−1.076 to 0.666)
AIDS at initial diagnosis	−1.000 (−2.063 to 0.063)	−0.632 (−1.373 to 0.109)

The influential-observation model excluded 14 observations with Cook's distance > 4/n and used HC3 robust standard errors. Median regression estimates are reported at the 50th percentile; the age and schooling coefficients were numerically close to zero and round to 0.000 at three decimals. CI indicates confidence interval.

4. Discussion

This analysis focused on continuous MoCA performance rather than defining neurocognitive impairment from a fixed threshold. The median score was 26, with substantial variability across participants. Although age was associated with slightly lower scores in the full-sample sensitivity model, no factor demonstrated a robust independent association in the primary complete-case model, and the prespecified model explained only 2% of score variation. In particular, the data did not provide clear evidence that AIDS at initial diagnosis was independently associated with MoCA performance.

The finding that 47.1% of participants scored below 26 should be interpreted cautiously. The cutoff originated in a different clinical context and does not by itself identify a pathological state in this cohort. MoCA performance is sensitive to demographic, educational, linguistic, and cultural factors, and studies among people with HIV have shown variable screening accuracy across settings [4] [5]. Recent Mexican regression-based norms reinforce that age and education should

be incorporated into interpretation rather than relying on a universal threshold [7]. Because this study lacked an HIV-negative comparison group, exact years of education, and population-matched norms applicable to the available variables, it cannot estimate excess cognitive morbidity attributable to HIV.

The age finding was small and should be interpreted in the context of sample composition and uncertainty rather than statistical significance alone. The primary complete-case model included 191 participants and yielded an estimate of -0.020 MoCA points per year (95% CI, −0.071 to 0.032). When the 51 participants with unknown initial AIDS status were retained as a separate category, the estimate was −0.045 points per year (95% CI, −0.086 to −0.004). Those 51 participants were slightly older than participants with known AIDS status, whereas their MoCA scores and schooling distribution were similar. Thus, the modest change in the age coefficient may partly reflect the altered age composition and additional information in the full sample. The confidence intervals overlapped substantially, and the two models should not be interpreted as demonstrating qualitatively different age effects solely because one P value crossed the conventional 0.05 threshold. The spline sensitivity analysis did not indicate substantial departure from an approximately linear age association.

The original dichotomous analysis emphasized AIDS at initial diagnosis because the crude association reached P = 0.045. The continuous analysis did not support a clear association, and the adjusted historical-threshold model remained nonsignificant. It would therefore be inappropriate to describe a consistent association or infer persistent neurological injury from these data. Advanced disease at diagnosis remains biologically plausible as a risk marker, but the current study was not sufficiently informative to establish that relationship.

The results do not directly support routine cognitive screening for all patients in HIV care. The study did not evaluate whether screening improved clinical outcomes, the sensitivity or specificity of MoCA against a reference standard, downstream diagnostic yield, acceptability, harms, or cost-effectiveness. Clinically, a low MoCA score may justify individualized review when cognitive concerns are present, but it should prompt assessment of function and alternative causes rather than a diagnosis of HAND. Current consensus emphasizes clinically meaningful symptoms, appropriate normative comparison, and exclusion of confounding conditions [3].

Strengths of the study include data from an underrepresented Mexican HIV clinic population, a clearly defined clinical setting, and transparent analysis of MoCA as a continuous measure. The model used prespecified covariates, reported missingness and analytic denominators, avoided significance-based variable selection, and included model diagnostics and sensitivity analyses.

Several limitations remain. The cross-sectional design precludes temporal or causal inference. Participants were recruited through consecutive non-probability sampling as they attended a single specialized clinic, without random selection. Although consecutive enrollment is less selective than purely discretionary recruitment,

the number approached, the number who declined, and reasons for non-enrollment were unavailable; selection bias cannot be excluded, and generalizability beyond this predominantly male and relatively young clinic population is limited. There was no HIV-negative sociodemographically matched control group and no comprehensive neuropsychological reference standard or functional assessment. Exact years of education, the educational score correction applied during MoCA administration, examiner certification, and item-level responses were unavailable. Depression, anxiety, sleep disorders, substance use, syphilis, and other potential cognitive confounders were not systematically assessed. Several clinical variables had missing values, particularly AIDS status at diagnosis, and the small number of participants in some categories limited precision. Although the comparison of participants with known and unknown AIDS status suggested similar MoCA scores and schooling distributions, the unknown-status group was slightly older, so complete-case exclusion may have altered the age composition of the primary analytic sample. Finally, the modest sample size and low explained variance limited the ability to detect small associations or build a more comprehensive multivariable model.

5. Conclusion

In this clinic-based cohort of adults with HIV in Mexico, median MoCA performance was 26 points, but the study did not identify robust independent associations between MoCA score and age, schooling, or AIDS at initial diagnosis in the primary model. The percentage scoring below 26 must not be interpreted as the prevalence of a neurocognitive disorder. Future studies should include sociodemographically matched HIV-negative participants or appropriate regression-based norms, comprehensive neuropsychological and functional assessment, and systematic measurement of psychiatric, substance-related, infectious, vascular, and social confounders.

Acknowledgements

The authors thank the participants and the staff of the HIV/AIDS Clinic of Hospital General Regional No. 1, Instituto Mexicano del Seguro Social, Querétaro, Mexico, for their support during participant recruitment and data collection.

Author Contributions

JARE contributed to study conception and design, data collection, data analysis, interpretation, and drafting. RMA contributed to clinical supervision, interpretation, and critical revision. JJGG contributed to study supervision, methodological guidance, interpretation, and critical revision. All authors reviewed and approved the final manuscript and agreed to be accountable for the work.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Saloner, R. and Cysique, L.A. (2017) HIV-Associated Neurocognitive Disorders: A Global Perspective. *Journal of the International Neuropsychological Society*, **23**, 860-869. https://doi.org/10.1017/s1355617717001102

[2] Mastrorosa, I., Pinnetti, C., Brita, A.C., Mondi, A., Lorenzini, P., Del Duca, G., *et al.* (2022) Declining Prevalence of Human Immunodeficiency Virus (HIV)-Associated Neurocognitive Disorders in Recent Years and Associated Factors in a Large Cohort of Antiretroviral Therapy-Treated Individuals with HIV. *Clinical Infectious Diseases*, **76**, e629-e637. https://doi.org/10.1093/cid/ciac658

[3] Nightingale, S., Ances, B., Cinque, P., Dravid, A., Dreyer, A.J., Gisslén, M., *et al.* (2023) Cognitive Impairment in People Living with HIV: Consensus Recommendations for a New Approach. *Nature Reviews Neurology*, **19**, 424-433. https://doi.org/10.1038/s41582-023-00813-2

[4] Brouillette, M.J., Mayo, N., Fellows, L.K., Lebedeva, E., Higgins, J., Overton, E.T., *et al.* (2015) A Better Screening Tool for HIV-Associated Neurocognitive Disorders: Is It What Clinicians Need? *AIDS*, **29**, 895-902. https://doi.org/10.1097/qad.0000000000000152

[5] Joska, J.A., Witten, J., Thomas, K.G., Robertson, C., Casson-Crook, M., Roosa, H., *et al.* (2016) A Comparison of Five Brief Screening Tools for HIV-Associated Neurocognitive Disorders in the USA and South Africa. *AIDS and Behavior*, **20**, 1621-1631. https://doi.org/10.1007/s10461-016-1316-y

[6] Aguilar-Navarro, S.G., Mimenza-Alvarado, A.J., Palacios-García, A.A., Samudio-Cruz, A., Gutiérrez-Gutiérrez, L.A. and Ávila-Funes, J.A. (2018) Validez y confiabilidad del MoCA (Montreal Cognitive Assessment) para el tamizaje del deterioro cognoscitivo en méxico. *Revista Colombiana de Psiquiatría*, **47**, 237-243. https://doi.org/10.1016/j.rcp.2017.05.003

[7] Parra-Rodríguez, L., Silva-Pereyra, J., Sánchez-García, S., García-Peña, C., Flores-Vázquez, J.F. and Roa-Rojas, P. (2025) Normative Data for the Montreal Cognitive Assessment (MoCA) in Mexican Adults: A Regression-Based Approach. *Diagnostics*, **15**, Article 2920. https://doi.org/10.3390/diagnostics15222920

[8] von Elm, E., Altman, D.G., Egger, M., Pocock, S.J., Gøtzsche, P.C. and Vandenbroucke, J.P. (2007) The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for Reporting Observational Studies. *The Lancet*, **370**, 1453-1457. https://doi.org/10.1016/s0140-6736(07)61602-x

[9] Nasreddine, Z.S., Phillips, N.A., Bédirian, V., Charbonneau, S., Whitehead, V., Collin, I., *et al.* (2005) The Montreal Cognitive Assessment, Moca: A Brief Screening Tool for Mild Cognitive Impairment. *Journal of the American Geriatrics Society*, **53**, 695-699. https://doi.org/10.1111/j.1532-5415.2005.53221.x