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Educational attainment and Montreal Cognitive Assessment performance among adults in southern Ecuador

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Short Report

Keywords: Cognitive Dysfunction, Ecuador, Educational Status, Mental Status and Dementia Tests, Public Health

Posted Date: November 6th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11437424/v1

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Additional Declarations: No competing interests reported.

Abstract

Objective

To examine educational differences in Montreal Cognitive Assessment performance in a community health project in southern Ecuador.

Results

The analysis included 174 adults recruited by convenience sampling. Median raw scores were 19.0, 23.0, and 25.0 for primary, secondary, and higher education, respectively (Kruskal–Wallis $H(2) = 36.65$; $p < 0.001$). In linear regression with heteroscedasticity-consistent standard errors, primary education was associated with a 5.30-point lower score than higher education after adjustment for age and recorded gender (95% confidence interval − 7.22 to − 3.37). The corresponding difference for secondary education was − 1.83 points (− 3.68 to 0.02). Using the education correction recorded in the dataset, 137 of 174 participants (78.7%) scored below 26. The primary–higher difference persisted in sensitivity analyses, while the secondary–higher comparison varied across specifications. These findings support considering educational context when interpreting screening scores. They do not establish cognitive decline or the prevalence of clinically diagnosed cognitive impairment.

Introduction

Educational attainment is closely related to performance on cognitive screening tests. The Montreal Cognitive Assessment (MoCA) was developed to identify people who may need further assessment for mild cognitive impairment[1]. However, studies in Ecuador and Colombia show that schooling affects scores, including performance on tasks requiring literacy and familiarity with formal testing [2–4]. In rural Ecuador, MoCA scores have also been associated with cortical atrophy, illustrating that low scores can reflect both educational influences and underlying brain health[5, 6] .

Education is often used as a proxy for cognitive reserve, but a screening score cannot distinguish reserve from test familiarity or clinical disease [7].

According to Stern's framework, cognitive reserve is actively shaped by education, occupational complexity, and environmental stimulation; in community adults, lower formal education is often associated with higher attentional demand on formal cognitive tasks, leading to potential misclassification in screening tools [8, 9].

Much of the regional evidence concerns older adults. Community data that include adults in midlife can help assess how educational differences appear outside memory clinics. Using cognitive screening data from a wider community health project, we examined the association between educational attainment and MoCA performance in adults assessed in seven localities in Loja Province, southern Ecuador. Raw

scores were the primary outcome; results below the conventional screening threshold were examined separately.

Methods and materials

Study design and participants

We conducted a descriptive cross-sectional study of 174 adults aged 30–60 years from communities in southern Ecuador. Reporting was guided by STROBE [10]. The parent community health project recruited a convenience sample at free health fairs in Calvas and Gonzanamá, Loja Province, during two weeks in June–July 2023. Project personnel, Ministry of Public Health staff, and community leaders publicized the fairs. Mobile assessment stations operated in schools, gymnasiums, and other community centres. The published fieldwork description reports a consistent assessment area, the same evaluation team across locations, and prior general staff training [11] .

The MoCA records came from Changaimina, Cruz de Yanzapa, El Lucero, Naranjillo, El Tablón, Bella María, and Cariamanga. The initial dataset contained 184 records. Ten records with unavailable age were excluded, leaving 174 participants for analysis. No further exclusions or additional age cutoffs were applied. The file included rural and urban residents and people reporting no current employment; this analysis therefore describes community adults. Sample size was determined by the available records. Data were originally entered in OpenClinica.

The present report examines educational attainment and cognitive screening in the 174-participant MoCA dataset.

Measures and data preparation

Educational attainment was grouped as primary, secondary, or higher, following the recorded categories (Additional file 1, Table S1). These labels describe reported attainment and do not necessarily establish completion of a qualification. All retained records had classified education and numeric age; observed ages ranged from 30 to 60 years. Recorded gender followed the source dictionary, using women and men.

The Spanish MoCA yields a maximum of 30 points across visuospatial/executive skills, naming, attention, language, abstraction, delayed recall, and orientation [1]. Cognitive assessment was conducted using the official Spanish version of the instrument. Evaluations were administered in person under standardized conditions—in a quiet, well-lit, distraction-free environment, with an average duration of 10 to 15 minutes—by trained researchers certified in the standardized administration of the test, strictly following official scoring criteria and instructions. We recomputed raw totals from the seven domain subtotals. Agreement between those subtotals and the 28 scored items had previously been verified against the recorded value.

For the secondary threshold analysis, we retained the recorded education correction: one point in 124 records, with totals capped at 30. The standard MoCA correction depends on actual years of formal education [12]. Individual years were not independently verified here, and the earlier coding crosswalk inferred them from educational labels. The corrected total therefore defined an operational screening outcome below 26, rather than a clinical diagnosis.

Additional file 3 provides the de-identified analytical dataset and data dictionary. Participant identifiers and collection localities use release codes, without original identifiers or a geographic crosswalk. Only variables needed for the reported analyses are included.

Statistical analysis

We summarized categorical variables as counts and percentages, and scores and age using means with sample standard deviations or medians with interquartile ranges (IQRs). Raw MoCA scores were compared across educational groups using Kruskal–Wallis and pairwise Dunn tests with Bonferroni correction. Ordinary least-squares regression estimated educational differences in mean raw score, adjusting for age as a continuous variable and recorded gender. We used HC3 heteroscedasticity-consistent standard errors and t-based 95% confidence intervals (CIs). Higher education and women were the reference categories.

The screening outcome was summarized using Wilson 95% CIs. We used Pearson's chi-square test and Cramér's V for categorical associations, and Poisson regression with a log link and robust sandwich variance to estimate prevalence ratios [13]. All 174 records had complete age, education, gender, and MoCA scores and entered the principal descriptive comparisons and adjusted models. No values were imputed.

Exploratory sensitivity analyses added fixed effects for collection locality, restricted analyses to rural residents or participants reporting current work and varied the screening correction. The correction scenarios used no adjustment or added one point to all primary and secondary records; they assessed sensitivity to scoring assumptions and were not alternative diagnostic rules. Tests were two-sided. Analyses were recomputed in Python 3.12.14 with NumPy 2.3.5 and SciPy 1.17.0; Additional file 2 provides the script.

Results

Of the 174 participants, 102 (58.6%) were women, 134 (77.0%) were rural residents, and 11 (6.3%) reported no current employment. Median age was 45.0 years (IQR 37.0–55.0). Educational attainment was primary in 87 participants, secondary in 60, and higher in 27 (Table 1).

Table 1
Participant characteristics

Characteristic	Value
Women	102 (58.6)
Men	72 (41.4)
Age in years, median (IQR)	45.0 (37.0–55.0)
Rural residence	134 (77.0)
Urban residence	40 (23.0)
Formal employment	57 (32.8)
Informal employment	87 (50.0)
Occasional work	19 (10.9)
Not currently working	11 (6.3)
Primary education	87 (50.0)
Secondary education	60 (34.5)
Higher education	27 (15.5)

Values are n (%) of 174 participants unless stated otherwise. Age and education are complete in the final corrected dataset. Gender labels follow the source dictionary.

The mean raw MoCA score was 20.44 (SD 5.11), with a median of 21.0 (IQR 17.0–24.0) and a range of 8–30. Raw scores differed across educational groups ($H(2) = 36.65$; $p < 0.001$; Table 2).

Table S1
Educational categories

Analytical group	Value in corrected workbook	n
Primary	Primary	87
Secondary	Secondary	60
Higher	Higher	27
Educational groups follow the recorded categories in the analytical dataset. Completion of qualifications and exact years of schooling were not independently verified. No unclassified educational records remain. Raw-score analyses use the recorded categories without inferring years of education.		

Table 2
MoCA performance and screening results by educational attainment

Education	n	Raw score mean (SD)	Raw score median (IQR)	Corrected score < 26 n (%)	95% CI for %
Primary	87	18.18 (5.11)	19.0 (14.0–22.0)	77 (88.5)	80.1–93.6
Secondary	60	22.03 (4.07)	23.0 (20.0–25.0)	45 (75.0)	62.8–84.2
Higher	27	24.19 (3.54)	25.0 (21.0–27.0)	15 (55.6)	37.3–72.4

Table S2
Descriptive MoCA domain and total scores

Score component	Mean (SD)	Observed range	Maximum
Visuospatial and executive	2.81 (1.33)	0–5	5
Naming	2.55 (0.72)	0–3	3
Attention	3.90 (1.62)	0–6	6
Language	1.95 (0.99)	0–3	3
Abstraction	1.46 (0.76)	0–2	2
Delayed recall	2.11 (1.68)	0–5	5
Orientation	5.66 (0.73)	0–6	6
Raw total	20.44 (5.11)	8–30	30
Stored corrected total	21.16 (4.97)	8–30	30

n = 174 for every row. SDs use the sample denominator n − 1. Raw totals were recomputed from the seven domain subtotals. Agreement between domain and item-level scoring had previously been checked in the original collection workbook. Domain summaries do not diagnose domain-specific impairment.

Table S3
Sensitivity analyses of adjusted raw MoCA scores

Analysis	n	Primary vs higher difference (95% CI)	Secondary vs higher difference (95% CI)
Principal complete-record model	174	−5.30 (− 7.22 to − 3.37)	−1.83 (− 3.68 to 0.02)
Additional locality fixed effects	174	−6.34 (− 8.29 to − 4.39)	−2.36 (− 4.16 to − 0.57)
Rural residents only	134	−6.76 (− 9.19 to − 4.32)	−3.47 (− 5.96 to − 0.99)
Participants reporting current work	163	−5.00 (− 7.02 to − 2.97)	−1.38 (− 3.25 to 0.50)

All models adjust for continuous age and recorded gender, using ordinary least-squares regression with HC3 heteroscedasticity-consistent standard errors and t-based 95% confidence intervals. Estimates describe mean differences in raw MoCA score points relative to higher education (reference category). The locality model additionally includes fixed effects for seven collection sites. “Current work” includes formal, informal, or occasional employment. CI: confidence interval; MoCA: Montreal Cognitive Assessment.

Table S4
Prevalence ratios for stored corrected MoCA scores below 26

Variable	Crude PR (95% CI)	p	Adjusted PR (95% CI)	p
Higher education	1.00 (reference)	—	1.00 (reference)	—
Primary education	1.59 (1.13 to 2.25)	0.008	1.58 (1.11 to 2.25)	0.012
Secondary education	1.35 (0.93 to 1.95)	0.110	1.34 (0.93 to 1.93)	0.122
Age per additional year	—	—	1.002 (0.994 to 1.010)	0.622
Men versus women	—	—	1.06 (0.92 to 1.24)	0.415

Poisson regression with log link and robust sandwich variance without a finite-sample scaling factor. Crude and adjusted estimates: n = 174, 137 screening results below 26; all predictors entered simultaneously. Reference categories are higher education and women. Global adjusted education Wald $\chi^2(2) = 8.63$; $p = 0.013$. These prevalence ratios concern a screening classification, not diagnosed cognitive impairment.

Table S5
Sensitivity of screening analyses to education correction

Scenario	n	Below 26 n	Primary vs higher adjusted PR (95% CI)	Secondary vs higher adjusted PR (95% CI)
Recorded correction	174	137	1.58 (1.11 to 2.25)	1.34 (0.93 to 1.93)
No education correction	174	146	1.71 (1.21 to 2.41)	1.51 (1.06 to 2.15)
One point for all primary and secondary records	174	134	1.54 (1.08 to 2.21)	1.24 (0.84 to 1.81)

Models adjust for continuous age and recorded gender using robust Poisson regression. Scores remain capped at 30 when adding a point. Correction scenarios are exploratory checks on the recorded coding and are not validated scoring alternatives. Without an independent clinical reference, none estimates diagnostic accuracy or establishes an appropriate cutoff for this population.

Educational comparisons use all 174 participants. Percentages are calculated within each educational group. CIs use the Wilson method. The corrected total retains the education correction stored in the dataset and is not a clinical diagnosis. Kruskal–Wallis $H(2) = 36.65$; $p < 0.001$. Dunn–Bonferroni: primary versus secondary and primary versus higher, both adjusted $p < 0.001$; secondary versus higher, adjusted $p = 0.205$.

Primary scores were lower than secondary and higher scores in Dunn–Bonferroni comparisons (both adjusted $p < 0.001$). The secondary–higher comparison was inconclusive (adjusted $p = 0.205$). Domain summaries are presented descriptively in Additional file 1, Table S2.

After adjustment for age and recorded gender, primary education was associated with a 5.30-point lower mean raw score than higher education (95% CI − 7.22 to − 3.37; $p < 0.001$). The difference for secondary education was − 1.83 points (− 3.68 to 0.02; $p = 0.052$; Table 3). Primary–higher differences persisted after adjustment for locality (− 6.34; −8.29 to − 4.39), among rural residents (− 6.76; −9.19 to − 4.32), and among participants reporting current work (− 5.00; −7.02 to − 2.97). The secondary–higher comparison varied across these specifications (Additional file 1, Table S3).

Using the recorded education correction, 137 of 174 participants scored below 26 (78.7%; 95% CI 72.1–84.2). Proportions were 88.5%, 75.0%, and 55.6% for primary, secondary, and higher education ($\chi^2(2) = 14.13$; $p < 0.001$; Cramér's $V = 0.28$). The age- and gender-adjusted prevalence ratio for primary versus higher education was 1.58 (95% CI 1.11–2.25; $p = 0.012$). There was no clear evidence of an association between corrected-score screening status and recorded gender ($\chi^2(1) = 0.24$; $p = 0.622$). Supplementary prevalence ratios and correction scenarios appear in Additional file 1, Tables S4 and S5.

Discussion

The present findings align with previous Ecuadorian studies demonstrating that low formal schooling correlates with lower cognitive screening scores across urban and rural populations [2, 14, 15] .Studies

conducted in southern Ecuador (Cuenca) and nationwide have consistently identified educational attainment as a critical determinant of MoCA performance and validations outcomes in Ecuadorian adults [15] .

Primary education was associated with lower raw MoCA performance in this community sample, including after adjustment for age and recorded gender. The association was also present when the analysis was restricted to rural residents or people reporting current work. This consistency supports an educational difference within the available dataset. It does not show that additional schooling would cause a corresponding improvement in cognition.

The findings agree with Ecuadorian work showing educational influences on both full and basic MoCA versions and with Colombian evidence of schooling-related differences on literacy-dependent tasks [2, 3]. Cognitive reserve offers one possible explanation [7], but we did not measure reserve, literacy, school quality, or occupational complexity. Differences in test familiarity and unmeasured health or socioeconomic conditions could also contribute [16] .

The high proportion below 26, including 55.6% of participants with higher education, requires particular care. Without an independent clinical reference, these results cannot estimate diagnostic sensitivity, specificity, or false-positive rates. A Chilean validation study found different optimal thresholds for older adults and used additional educational adjustments [17]. Such thresholds cannot simply be transferred to this younger, differently selected sample. Our raw-score analysis avoids making the principal finding depend on a single cutoff or on the category-derived education correction.

Furthermore, occupational conditions in rural settings, where agricultural labor and informal work predominate, may introduce specific sociodemographic dynamic that influence cognitive performance independently of age [11, 18, 19] .

For community screening, the relevant implication is to interpret low scores alongside educational history, daily functioning, and clinical assessment. The results support further work on appropriate interpretation in comparable settings; they do not provide a locally validated diagnostic threshold.

Limitations

Convenience sampling and the absence of a population sampling frame limit generalizability. The cross-sectional design cannot establish cognitive decline, temporal sequence, or causality. Educational labels do not establish actual years of schooling, which were not independently verified. The recorded correction may therefore classify some screening outcomes incorrectly. Selection into the analytical sample, including omission of records with unavailable age, could introduce bias. The number approached before dataset construction was unavailable.

No independent neuropsychological or clinical diagnosis was available. Adjustment was limited to age and recorded gender, leaving potential confounding by literacy, depression, vascular health, sleep, and

socioeconomic conditions. Sensitivity analyses were exploratory and did not remove these limitations. Locality fixed effects addressed differences between sites but did not establish independence of observations within communities. The small higher-education group further limits precision. These data describe educational differences in screening performance rather than the prevalence of a neurocognitive disorder.

Abbreviations

CI
confidence interval
CISeAL
Centro para la Salud en América Latina
HC3
heteroscedasticity-consistent covariance estimator with leverage correction
IQR
interquartile range
MoCA
Montreal Cognitive Assessment
SD
standard deviation
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology.

Declarations

Ethics approval and consent to participate

This study was approved by the Human Research Ethics Committee (CEISH) of the Pontifical Catholic University of Ecuador with the code CEISH-461-2023. Written informed consent to participate was obtained from all individual participants prior to their inclusion in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Use of generative artificial intelligence

ChatGPT (OpenAI) assisted with English translation, editorial restructuring, reference checking, and preparation of analysis code. Responsibility for scientific content, verification, and the decision to submit remains with the authors.

Additional files

Additional file 1 (DOCX). Educational coding, domain scores, and supplementary analyses. Contains Tables S1–S5 with the educational coding dictionary, descriptive MoCA domain scores, sensitivity analyses of raw scores, prevalence ratios, and alternative correction scenarios.

Additional file 2 (PY). Reproducible Python script for computing the reported analyses from Additional file 3. Dependencies: NumPy, SciPy, and lxml.

Additional file 3 (XLSX). De-identified analytical dataset and data dictionary. Contains 174 records, 23 variables, transparent scoring formulas, analytical inclusion flags, and the Data and Dictionary worksheets.

Funding

Not applicable.

Author Contribution

Conceptualization, M.I.M.P and D.E.V.M; methodology, M.I.M.P and S.O.I.J.; software, S.O.I.J. D.S.C.C. and D.E.V.M.; validation, S.O.I.J.; formal analysis, J.M.P.; investigation, M.I.M.P. and D.E.V.M.; resources, M.I.M.P.; data curation, S.O.I.J.; writing—original draft preparation, D.E.V.M., D.S.C.C. and J.M.P.; writing—review and editing, D.E.V.M., D.S.C.C. and S.O.I.J.; visualization, J.M.P.; supervision, M.I.M.P. and S.O.I.J.; project administration, M.I.M.P.

Acknowledgement

We thank the participating communities and the health-fair teams for their support during data collection.

Data Availability

The datasets generated and analyzed for the execution of this study are available from the corresponding author on reasonable request.

References

1. Nasreddine ZS, Phillips NA, Bédirian V, Charbonneau S, Whitehead V, Collin I, et al. The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment. J Am Geriatr Soc. 2005;53(4):695–9. 53221.X PubMed PMID: 15817019.
2. Adana Diáz L, Arango A, Parra C, Rodríguez-Lorenzana A, Yacelga-Ponce T. Impact of Educational Level on Versions (Basic and Complete) of the Montreal Cognitive Assessment. Dement Geriatr Cogn Disord. 2021;50(4):341–8. doi:10.1159/000518747 PubMed PMID: 34808623.
3. Gómez F, Zunzunegui MV, Lord C, Alvarado B, García A. Applicability of the MoCA-S test in populations with little education in Colombia. Int J Geriatr Psychiatry. 2013;28(8):813–20. 10.1002/GPS.3885 PubMed PMID: 22996789.
4. Rojas Zepeda C, Riffo Ocares B. Procesamiento léxico-semántico en el envejecimiento e influencias sociodemográficas: una mirada actual. Logos (La Serena). 2018;28(1):3–11. 10.15443/RL2801.
5. Del Brutto OH, Mera RM, Zambrano M, Soriano F, Lama J. Global cortical atrophy (GCA) associates with worse performance in the Montreal Cognitive Assessment (MoCA). A population-based study in community-dwelling elders living in rural Ecuador. Arch Gerontol Geriatr. 2015;60(1):206–9. .2014.09.010 PubMed PMID: 25306507.
6. Aguilar-Navarro SG, Mimenza-Alvarado AJ, Palacios-García AA, Samudio-Cruz A, Gutiérrez-Gutiérrez LA, Ávila-Funes JA. Validez y confiabilidad del MoCA (Montreal Cognitive Assessment) para el tamizaje del deterioro cognoscitivo en méxico. Rev Colomb Psiquiatr. 2018;47(4):237–43. .2017.05.003 PubMed PMID: 30286846.
7. Stern Y, Cognitive reserve. Neuropsychologia. 2009;47(10):2015–28. 10.1016/J. .NEUROPSYCHOLOGIA.2009.03.004 PubMed PMID: 19467352.
8. Domínguez-Chávez CJ, Hernández Cortés PL, Cruz-Quevedo JE, Salazar-González BC. Estado cognitivo y estrategias de compensación de memoria en personas adultas mayores. Horizonte sanitario. 2021;20(3):427–33. 10.19136/HS.A20N3.4473.
9. Mías CD, Sassi M, Masih ME, Querejeta A, Krawchik R. Deterioro cognitivo leve: estudio de prevalencia y factores sociodemográficos en la ciudad de Córdoba, Argentina. Rev Neurol [Internet]. 2007 [cited 2025 Jul 29];44(12):733–8. Available from: https://dialnet.unirioja.es/servlet/articulo?codigo=2327697&info=resumen&idioma=SPA
10. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. BMJ: Br Med J. 2007;335(7624):806. 10.1136/BMJ.39335.541782. .AD PubMed PMID: 17947786.
11. Masson Palacios I, Vinueza-Fernandez I, Iñiguez-Jiminez SO, Grijalva MJ, Bates BR. Predictors of Low Back Pain Risk Among Farmers in Rural Communities of Loja, Ecuador. Int J Environ Res Public Health 2025. 2025;22(885):885. doi:10.3390/IJERPH22060885 PubMed PMID: 40566311.

12. MoCA Cognition. Frequently asked questions. [Internet]. [cited 2026 Oct 18]. Available from: https://mocacognition.com/faq/
13. Barros AJD, Hirakata VN. Alternatives for logistic regression in cross-sectional studies: An empirical comparison of models that directly estimate the prevalence ratio. BMC Med Res Methodol. 2003;3(1):1–13. 10.1186/1471-2288-3-21/TABLES/9 . PubMed PMID: 14567763.
14. Loureiro C, García C, Adana L, Yacelga T, Rodríguez-Lorenzana A, Maruta C. Uso del test de evaluación cognitiva de Montreal (MoCA) en América Latina: revisión sistemática. Rev Neurol. 2018;66(12):397–408. 10.33588/RN.6612.2017508 . PubMed PMID: 29897607.
15. Cabrera-Guerrero JA, Mazón-Ávila JP, Loja EP, Viñanzaca-López P. Deterioro cognitivo en población adulta mayor de Cuenca. Ecuador FACSALUD-UNEMI. 2024;8(14):80–8. 10.29076/ISSN.2602-8360VOL8ISS14.2024PP80-88P.
16. Ojeda N, Del Pino R, Ibarretxe-Bilbao N, Schretlen DJ, Peña J. Test de evaluación cognitiva de Montreal: normalización y estandarización de la prueba en población española. Revista de Neurología. 2016, 63(11), 488–496. 2016;63(11):488–96. 10.33588/RN.6311.2016241 PubMed PMID: 27874165.
17. Delgado C, Araneda A, Behrens MI. Validation of the Spanish-language version of the Montreal Cognitive Assessment test in adults older than 60 years. Neurología. 2019;34(6):376–85. 01.013 PubMed PMID: 28364958.
18. Gracia Rebled A, Santabárbara Serrano J, López Antón R, Tomás Aznar C, Marcos Aragüés G. Ocupación Laboral y Riesgo de Deterioro Cognitivo y Demencia en Personas Mayores de 55 Años: Una Revisión Sistemática. Rev Esp Salud Pública [Internet]. 2016 [cited 2025 Apr 20];90:1–15. Available from: https://www.scielosp.org/article/ssm/content/raw/?resource_ssm_path=/media/assets/resp/v90/1135-5727-resp-90-e50001.pdf
19. Estévez AF, Abambari OC, Atiencia AR, Webster CF. Deterioro Cognitivo y Riesgo de Demencia, una Realidad para el Ecuador. Estudio de Factores de Riesgo en un Grupo de Pacientes Jubilados del IESS en Cuenca en el año 2013 - revecuatneurol - Revista Ecuatoriana de Neurología. Revista Ecuatoriana de Neurología [Internet]. 2014 [cited 2026 Oct 18];23. Available from: https://revecuatneurol.com/magazine_issue_article/deterioro-cognitivo-riesgo-demencia-realidad-ecuador-estudio-factores-grupo-pacientes-jubilados-iess-cuenca-2013/

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Additionalfile2MoCAData.xlsx
- Additionalfile1MoCASupplement.docx