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BACKGROUND

Although blood-based biomarkers (BBM) have been extensively investigated in high-income countries, studies focusing on South American populations remain scarce. We aimed to assess the diagnostic accuracy of plasma pTau217, GFAP, NFL, Abeta42/Abeta40 based on clinical diagnosis and CSF biomarker positivity, in a Brazilian cohort with low educational attainment.

METHODS

We evaluated BBM diagnostic performance of 353 participants in one memory-clinic cohort from Brazil (Cog-Aging Study). Participants were divided in three clinical groups, according to neuropsychological assessment, in dementia of Alzheimer's type (DAT), mild cognitive impairment (MCI) and cognitive unimpaired (CU). We compared fluid biomarkers, using Kruskal-Wallis and Dunn's post hoc analysis. We applied Generalized Linear Model to assess BBM adjusted for age, sex, education and estimated glomerular filtration rate (eGFR). Gaussian mixture modelling (GMM) was used to establish CSF Abeta42/Abeta40 and BBM cut-offs, tailored to our population. We employed ROC curves to compare the diagnostic accuracy of BBMs between amyloid-positive and amyloid-negative participants, as well as between CU and DAT groups.

Blood-based biomarkers achieved good diagnostic performance in admixed cohorts and support their use in low- and middle-income countries.

RESULTS

The sample included 353 participants across CSF-only, plasma-only, paired-sample, and non-paired-sample groups. Mean age ranged from 72.8 to 77.0 years, with a predominance of women. APOE ε4 carrier frequency ranged from 28.8% to 45.0%, and mean education from 4.4 to 6.5 years. Diagnostic distribution varied across groups, while BMI and renal function were broadly similar. Hypertension was the most frequent comorbidity, followed by dyslipidemia and depression.

Plasma pTau217, GFAP, NFL, and the pTau217/Aβ42 ratio progressively increased from CU to MCI and DAT, whereas the Aβ42/Aβ40 ratio was lower in DAT. Among participants with paired CSF and plasma samples, amyloid-positive individuals had higher pTau217, pTau217/Aβ42, and GFAP levels. These associations remained significant after adjustment for age, sex, education, and eGFR. pTau217 and the pTau217/Aβ42 ratio showed the best diagnostic performance, while the Aβ42/Aβ40 ratio performed poorly.

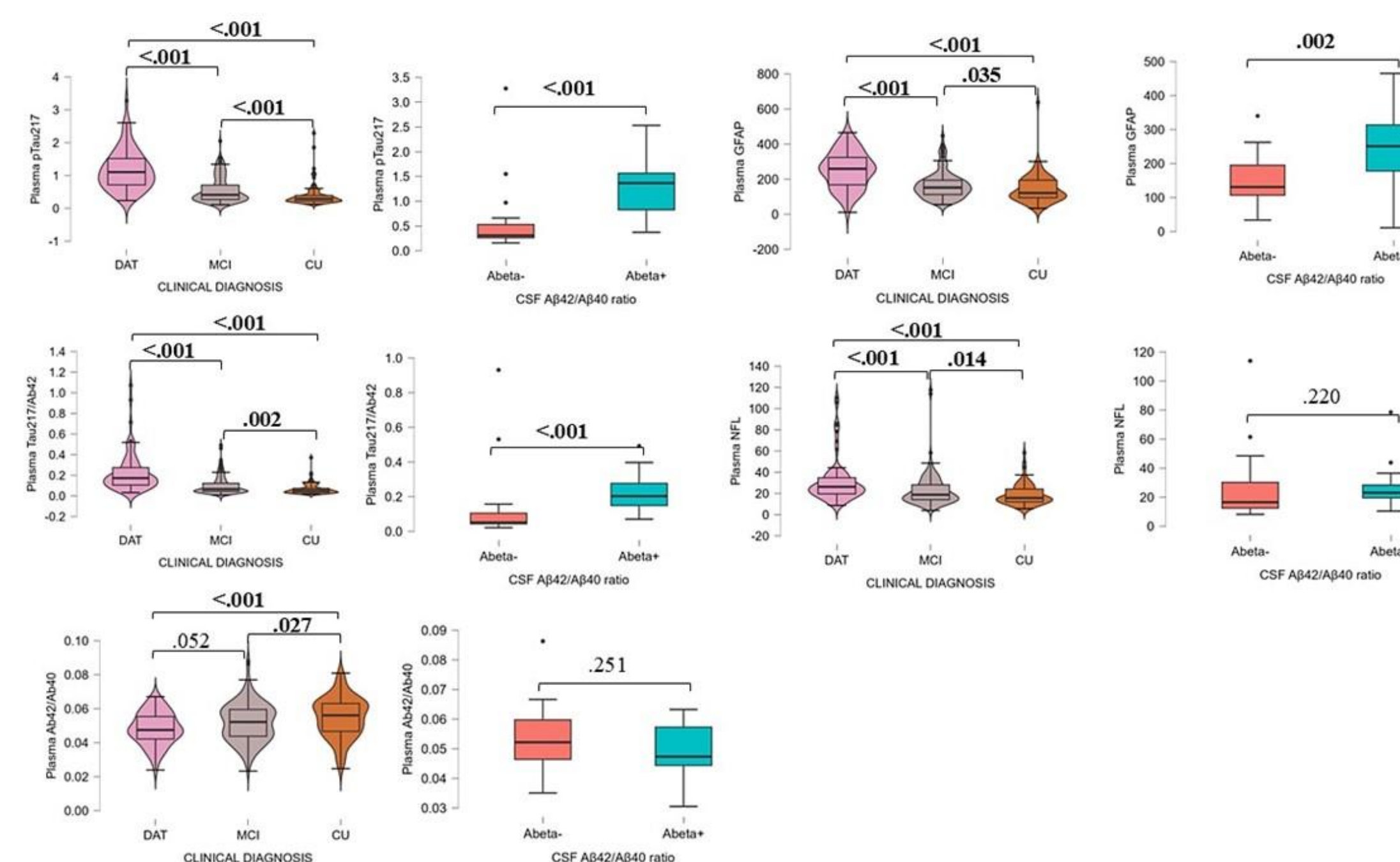


Figure 1: Comparison of BBM levels across clinical groups and according to amyloid CSF status.

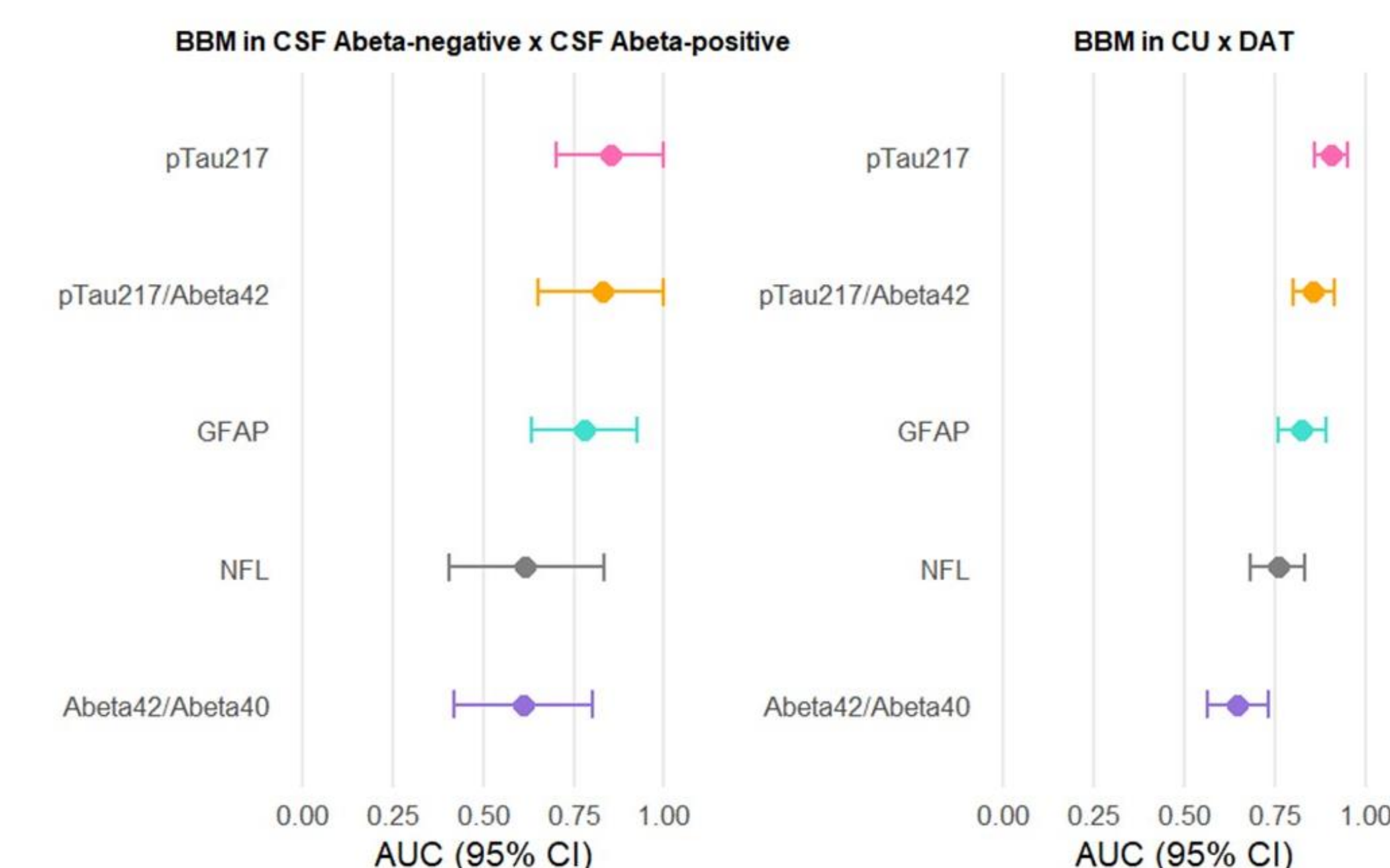


Figure 2: Diagnostic performance of plasma biomarkers.

CONCLUSION:

BBM achieved good diagnostic performance in admixed cohorts and support their use in low- and middle-income countries.

