





Effect of Sleep on Blood Biomarkers in Alzheimer's in military veterans: Emerging findings from the DoD-ADBI study

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FDA-approved Fujirebio Lumipulse G pTau 217/Amyloid 1-42 (pTau217/Aβ42) blood test had similar accuracy in older Veterans with and without insomnia, but significantly lower accuracy compared to published results in civilians¹ (90%). Caution is advised when using this test in Veterans.

Table 1.

Median (IQR), n

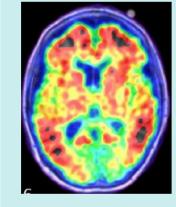
Background

- Recent evidence links sleep disturbances and abnormal clearance of brain amyloid and tau², two proteins associated with Alzheimer's disease (AD).
- In the past year, the FDA approved a blood test, pTau217/Aβ42 ratio¹, to aid in diagnosis of brain amyloid in patients with AD.
- We hypothesized that sleep quality may impact blood levels of amyloid and tau, rendering the test less accurate in patients with poor sleep quality (e.g., insomnia).
- Our aim was to determine whether insomnia is associated with differences in the accuracy of blood-based AD tests.

Methods

 We leveraged a cohort of Vietnam Veterans assessed for Alzheimer's biomarkers using amyloid PET imaging (gold standard), blood biomarkers, and a sleep quality survey.





Amyloid PET visual reads



Pittsburgh Sleep
Quality Index (PSQI)

≤5 = Normal

>5 = Insomnia



FujiReBio blood biomarkers
•Ptau217:Ab42 ratio

•Ab42:Ab40 ratio

•Ptau217

Results

- Insomnia is very common in Vietnam Veterans (77%)
- Insomnia is not associated with changes in levels or accuracy of AD blood biomarkers.
- But, AD test accuracy in Vietnam Veterans is lower than reported in civilians and lower than the 90% accuracy required to be used as a stand-alone diagnostic (Jack 2024, A&D)¹ (90%)

Conclusions

- No evidence that sleep quality as measured by PSQI interferes with accuracy of AD blood tests.
- New FDA-approved FujireBio AD blood test needs further validation in Veterans to guide appropriate use.

(%)	$N = 219^1$	N = 51 ¹	N = 168 ¹	value ²
Age	68.9 (66.6, 72.5)	69.2 (66.7 <i>,</i> 72.4)	68.8 (66.6, 72.5)	0.7
Male gender	217 (99%)	51 (100%)	166 (99%)	>0.9
Race				0.4
White	189 (86%)	47 (92%)	142 (85%)	
Black	14 (6.4%)	1 (2.0%)	13 (7.7%)	
Other	16 (7.3%)	3 (5.9%)	13 (7.7%)	
Years of education	15 (14, 18)	16 (14, 18)	15 (14, 18)	0.4
APOE ε4 carrier	63 (30%)	12 (25%)	51 (32%)	0.4
(Missing)	12	3	9	
Cognitive status				0.059
Normal	183 (84%)	47 (92%)	136 (81%)	
MCI	36 (16%)	4 (7.8%)	32 (19%)	
Baseline CDR				0.081
0	147 (71%)	38 (81%)	109 (68%)	
0.5	61 (29%)	9 (19%)	52 (32%)	
(Missing)	11	4	7	
Baseline ECog-39	57 (48, 73)	48 (43, 68)	61 (50, 77)	<0.001
Amyloid PET visual read				>0.9
Amyloid+	64 (29%)	15 (29%)	49 (29%)	
Amyloid-	155 (71%)	36 (71%)	119 (71%)	
ТВІ				0.9
None	80 (37%)	20 (39%)	60 (36%)	
TBI with LOC 0-5min	74 (34%)	17 (33%)	57 (34%)	
TBI with LOC > 5min	65 (30%)	14 (27%)	51 (30%)	
TBI in the last 10 years	23 (17%)	3 (9.7%)	20 (19%)	0.2
(Missing)	80	20	60	
TBI_last_year				0.8
TBI in the past year	13 (5.9%)	2 (3.9%)	11 (6.5%)	
TBI 1-10 years	10 (4.6%)	1 (2.0%)	9 (5.4%)	

PSQI total score 8 (6, 11) 5 (4, 5) 10 (7, 12) <0.001

¹Median (Q1, Q3); n (%)

²Wilcoxon rank sum test; Fisher's exact test; Pearson's Chi-

116 (53%)

80 (37%)

28 (55%)

20 (39%)

45 (27, 49) 44 (28, 49) 46 (25, 49)

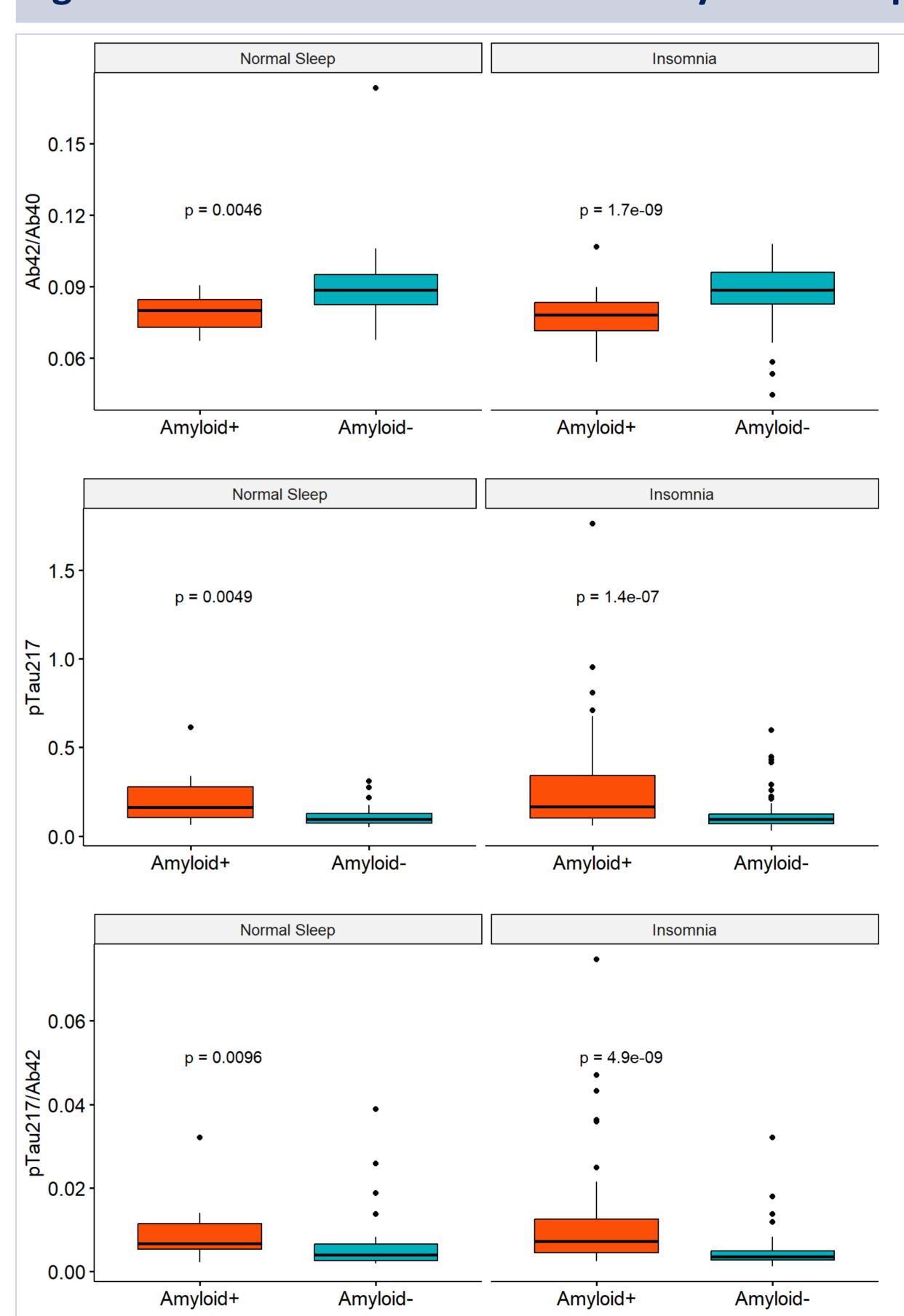
88 (52%)

60 (36%)

60

Table 2.												
	Biomarker	Sleep Group	AUC	Accuracy	NPV	PPV	Sens.	Spec.				
	Αβ 42/40	Normal Sleep	0.755 (0.615 - 0.895)	71% (62% - 80%)	76%	50%	33%	86%				
		Insomnia	0.796 (0.726 - 0.866)	75% (66% - 84%)	82%	57%	55%	83%				
	pTau217	Normal Sleep	0.753 (0.602 - 0.903)	76% (67% - 85%)	77%	71%	33%	94%				
		Insomnia	0.759 (0.678 - 0.84)	77% (68% - 86%)	77%	73%	33%	95%				
	•	Normal Sleep	0.73 (0.578 - 0.881)	73% (64% - 82%)	76%	56%	33%	89%				
		Insomnia	0.788 (0.709 - 0.867)	76% (67% - 85%)	77%	71%	31%	95%				

Figure 1. AD Blood Biomarker Levels by Sub-Group



AD blood biomarker levels (Aβ42/Aβ40, pTau217, and pTau217/Aβ42) by amyloid and sleep quality (PSQI) sub-groups. Boxplots show median and interquartile range; whiskers extend to 1.5×IQR. P-values reflect pairwise comparisons between amyloid— and amyloid+ groups within each PSQI stratum (Wilcoxon rank-sum test).

REFERENCES

squared test

TBI over 10

Years since TBI

years ago

No TBI

(where

applicable)

(Missing)

- 1. https://www.fda.gov/news-events/press-announcements/fda-clears-first-blood-test-used-diagnosing-alzheimers-disease
- 2. Chen CL, Zhang MY, Wang ZL, et al. Associations among sleep quality, sleep duration, and Alzheimer's disease biomarkers: A systematic review and meta-analysis. Alzheimers Dement. 2025;21(3):e70096. doi:10.1002/alz.70096
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