



Real-World Evidence Examining the Risk of Neurodegenerative and Cerebrovascular Diseases After *Helicobacter Pylori* Infection

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OBJECTIVES

Helicobacter pylori (*H. pylori*) infects approximately 30% to 40% of the United States (US) population and can alter gastrointestinal (GI) microbiota causing complications like ulcers and gastritis¹. Past studies have also linked *H. pylori* to neurodegenerative and cerebrovascular diseases through the disruption of the gut-brain axis, but these results remain controversial.^{2,3} Here, the association between *H. pylori* infection on the risk of neurodegenerative and cerebrovascular diseases is examined in US patients.

METHODS

Patients were identified in TriNetX US Dataworks, a federated network of de-identified electronic medical records. Adult patients were divided into two cohorts: patients with *H. pylori* (ICD-10 code B96.81; excluding B95 and all other B96 codes) and patients with any other disease-causing bacterial infection (ICD-10 codes B95 and B96; excluding B96.81). Patients were 50 years or older at the time of their infection. Anyone with a record of parkinsonism, cerebrovascular diseases, dementia, or cognitive impairment before the infection was excluded. Patients were required to have a documented visit sometime after their infection. The relative risks of Parkinson's disease (PD), Alzheimer's disease (AD), other dementia, and cerebrovascular diseases were calculated between cohorts. All comparisons were adjusted for baseline confounders using a 1:1 propensity score matching model (PSM). Risk ratios and 95% confidence intervals were calculated.

RESULTS

The standardized mean difference for all baseline characteristics after PSM was less than 14%. Patients with *H. pylori* had a significantly higher risk of AD (n=148,416, RR=1.30, 95% CI 1.14-1.49, P<0.001) but a significantly lower risk for other dementia (n=148,416, RR=0.84, 95% CI 0.78-0.89, P<0.001). There were no significant differences between cohorts for PD or cerebrovascular diseases.

CONCLUSION

This analysis provides additional real-world evidence supporting the connection between *H. pylori* infection and the heightened risk of AD, but not between *H. pylori* and other neurodegenerative or cerebrovascular diseases.

Figure 1: Study population

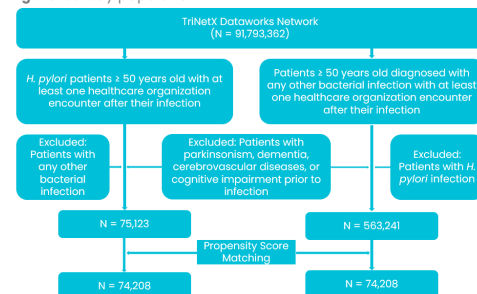


Figure 2: Propensity score matching

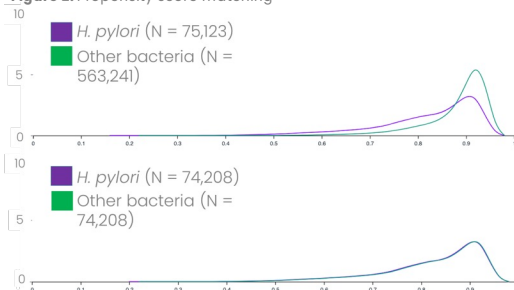


Figure 3: Demographics

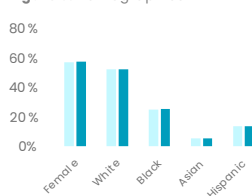


Figure 4: Age

	Age at Infection		Current Age	
	μ	\pm SD	μ	\pm SD
H. pylori	62.3	8.73	68.2	9.16
Other bacteria	62.2	8.93	68.2	9.43

Figure 5: Baseline comorbidities

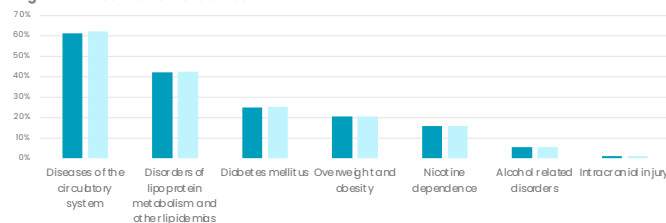
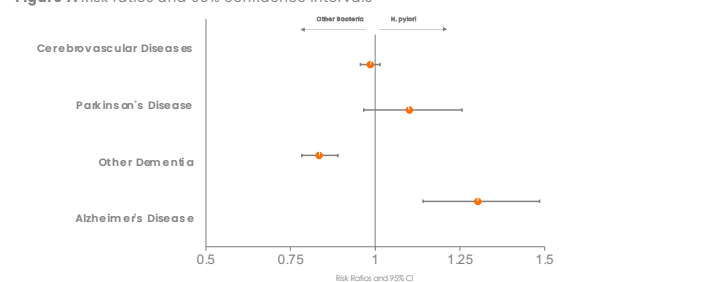


Figure 6: Baseline labs

	H. pylori		Other bacteria	
	μ	\pm SD	μ	\pm SD
BMI (kg/m ²)	29.4	6.82	29.6	6.98
Systolic Blood Pressure (mm[Hg])	129	19.7	127	20.5
Diastolic Blood Pressure (mm[Hg])	75.1	11.9	73.4	12.8
Total Cholesterol (mg/dL)	183	44.8	180	47.8

Figure 7: Risk ratios and 95% confidence intervals



1. *Helicobacter Pylori* infections (n.d.). MedlinePlus.gov. Retrieved April 20, 2023, from <https://medlineplus.gov/helicobacterpyloriinfections.html>.
2. Liu, N., Sun, J., Jiang, X., & Li, H. (2023). *Helicobacter pylori* infection and risk for developing dementia: an evidence-based meta-analysis of case-control and cohort studies. *Aging (Albany NY)*, 13(10), 22571-22587. doi:10.18632/aging.203571.
3. Shen, X., Yang, H., Wu, Y., Zhang, D., & Jiang, H. (2017). Meta-analysis Association of *Helicobacter pylori* infection with Parkinson's diseases. *Helicobacter*, 22(5), doi:10.1186/s12935-017-0355-5.