Association between Anticholinergic Burden and the Risk of Cardiovascular Events in Older Adults: A Systematic Review and Meta-Analysis

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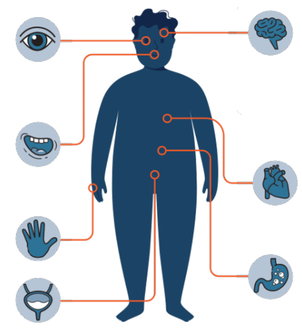
Background



- Anticholinergic burden (ACB) refers to the cumulative effect of multiple medications with anticholinergic properties, which affect multiple organ systems.
- ACB has been associated with adverse outcomes in older adults, such as cognitive decline, falls, and increased mortality.
- Recent evidence suggests a potential association between elevated ACB and cardiovascular (CV) events in the geriatric population.
- Current studies are limited by heterogeneous outcome definitions and methodological variability.

Objective

- This systematic review and meta-analysis aimed investigate the association between anticholinergic burden and cardiovascular events in older adults.

Methods

Literature Search
- Systematically searched PubMed, Embase, and CENTRAL up to Oct 31, 2024.
- Screened reference lists and consulted experts for additional studies.

Eligibility Criteria
- Included case-control, cohort, or randomized trials examining associations between ACB and CV events in older adults.
- Required use of validated ACB scales, primarily Anticholinergic Cognitive Burden (ACB) scale.

Outcomes of Interest
- Defined CV events as stroke, myocardial infarction, arrhythmias, heart failure, and CV deaths.
- Categorized and analyzed composite and individual CV outcomes separately.

Data Synthesis
- Performed a random-effects meta-analysis to calculate pooled hazard ratios (HRs) and odds ratios (ORs).
- Assessed study quality and heterogeneity.
- Conducted subgroup analyses and evaluation of dose-response effects.

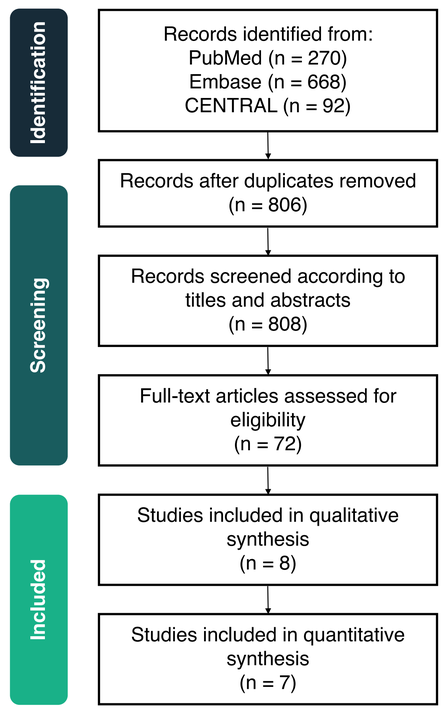


Figure 1. Flow Diagram for Systematic Review

Results

- A total of 7 studies (6 cohort studies, 1 case-case-time-control study) with 906,706 participants were included in the meta-analysis (**Fig. 1**).
- ACB was associated with increased risk of composite CV outcomes (HR 1.41, 95% CI 1.17-1.69; OR 1.65, 95% CI 1.12-2.43) (**Fig. 2A & 2B**), stroke (OR 1.50, 95% CI 1.20-1.87) (**Fig. 2C**), and CV deaths (OR 2.09, 95% CI 1.76-2.47) (**Fig. 2D**).
- More pronounced risk elevations were observed in high ACB (ACB score ≥3) for composite CV outcomes (HR 1.66, 95% CI 1.40-1.98; OR 1.56, 95% CI 1.05-2.32) (**Fig. 3A & 3B**) and stroke (OR 1.71, 95% CI 1.40-2.08) (**Fig. 3C**).

Fig. 2A

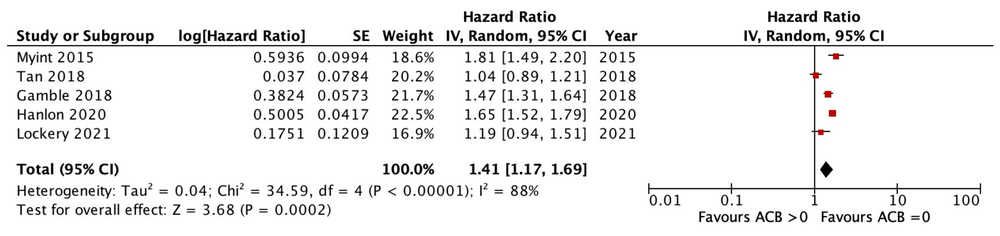


Fig. 2B

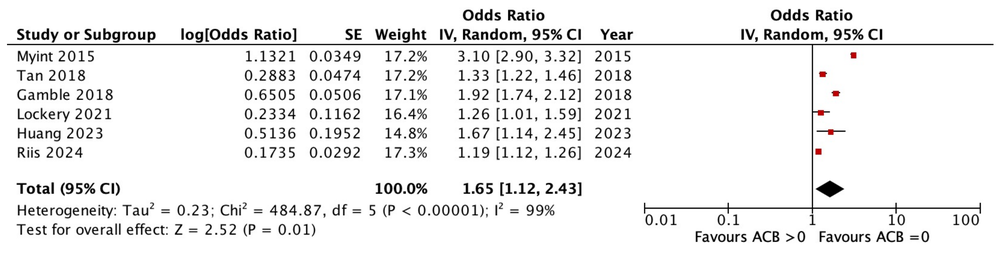


Fig. 2C

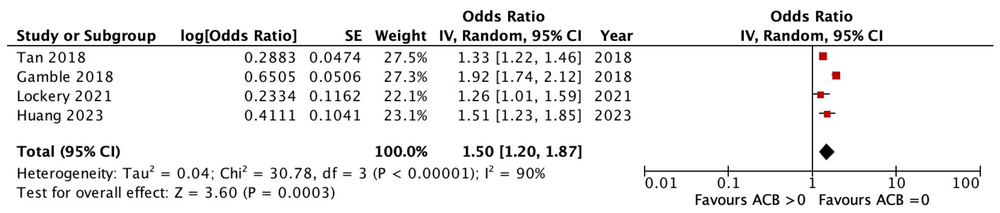


Fig. 2D

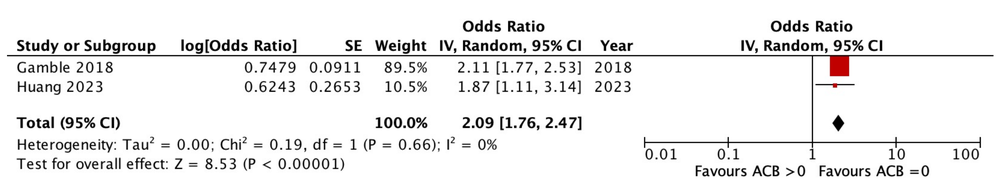


Figure 2. Forest plot of the association between anticholinergic burden and CV events.

A, Composite CV outcomes (pooled HRs); B, Composite CV outcomes (pooled ORs); C, Stroke; D, Cardiovascular deaths

Fig. 3A

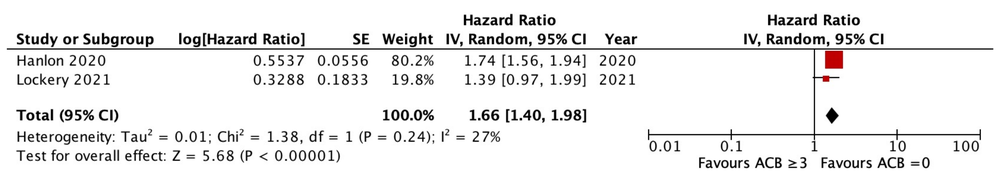


Fig. 3B

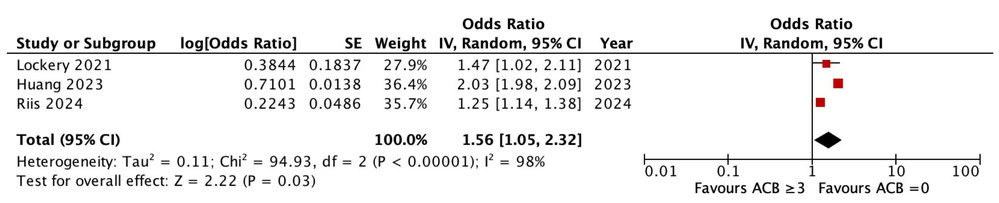


Fig. 3C

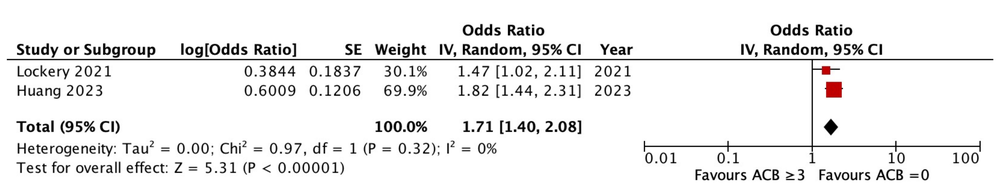


Figure 3. Forest plot of the association between high anticholinergic burden and CV events.

A, Composite CV outcomes (pooled HRs); B, Composite CV outcomes (pooled ORs); C, Stroke

Conclusions

- Anticholinergic burden is associated with increased cardiovascular risk in older adults, showing progressive increases with higher ACB.
- Clinical decision-making in older adults should consider CV risks associated with ACB.

Conflict of interest: All authors declared having no conflicts of interest that are directly relevant to the content of this study.

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