

Associations of clinical oral health measures with cognitive impairment among community-dwelling older adults in Taiwan

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Background

 Poor oral health has been linked to systemic inflammation and reduced sensory stimulation, adversely affecting cognitive function.

 **Research Gap:** Few longitudinal studies have examined associations between clinical oral health measures and domain-specific cognitive function.

 **Study Aim:** To investigate longitudinal associations of oral health (tooth count, gingivitis, and filled teeth) with global and domain-specific cognitive function among community-dwelling older adults.

Materials and Methods



► Study Design and Population

This **prospective cohort study** (2019–2025) is based on the Taiwan Initiative for Geriatric Epidemiological Research (TIGER), with **baseline assessments from 2019 to 2022** and **follow-up from 2022 to 2025**.

**Inclusion criteria:** Community-dwelling older adults (age ≥ 65 years)

**Exclusion criteria:** Baseline suspected dementia, medications for Alzheimer's disease, brain tumor, stroke history, traumatic brain injury with loss of consciousness ≥ 30 min, and lack of oral health data

► Statistical Analyses

**Descriptive analysis:** Mann–Whitney U test, chi-square test

**Multivariable analysis:** Generalized linear mixed models (GLMMs)

► Assessment of Cognitive Function

**Global cognition:** Taiwanese version of the Montreal Cognitive Assessment (MoCA-T)

**Domain-specific cognition:** **Memory, attention, verbal fluency,** and **executive function**

► Assessment of Oral Health

**Number of teeth:** Count of present teeth (sound or restored); range: 0–28

**Gingivitis:** Bleeding/swelling consistent with gingival inflammation; (0: none; 1–4: mild to very severe)

**Filled teeth:** Teeth with restorative dental fillings; range: 0–28



Results

At baseline (2019–2022), a total of 559 participants were included. Among them, 57.3% were women, with a mean age of 72 years and an average of 15 years of education.

Table 1. The association between oral health measures and cognitive impairment over time (2019–2025; N = 559)

| Oral variables         | Global cognition                         | Logical memory                        |                                       |                                       |                                       | Digit span                |                           | Trail Making Test         |                           | Verbal fluency            |
|------------------------|------------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|                        | MoCA-T                                   | Immediate theme recall                | Immediate free recall                 | Delayed theme recall                  | Delayed free recall                   | Forward                   | Backward                  | Part A                    | Part B                    |                           |
| $\hat{\beta}$ (95% CI) |                                          |                                       |                                       |                                       |                                       |                           |                           |                           |                           |                           |
| Number of teeth        | -0.042<br>(-0.100, 0.016)                | -0.018<br>(-0.043, 0.008)             | 0.001<br>(-0.023, 0.025)              | -0.012<br>(-0.037, 0.013)             | 0.001<br>(-0.023, 0.024)              | -0.016<br>(-0.045, 0.013) | -0.022<br>(-0.049, 0.006) | 0.003<br>(-0.006, 0.011)  | -0.003<br>(-0.025, 0.020) | 0.001<br>(-0.021, 0.022)  |
| Gingivitis             | <b>-0.254</b><br><b>(-0.447, -0.060)</b> | 0.017<br>(-0.068, 0.101)              | 0.009<br>(-0.063, 0.082)              | 0.041<br>(-0.041, 0.123)              | 0.018<br>(-0.054, 0.090)              | 0.004<br>(-0.084, 0.092)  | -0.035<br>(-0.121, 0.050) | -0.006<br>(-0.030, 0.018) | -0.007<br>(-0.075, 0.061) | -0.062<br>(-0.126, 0.002) |
| Tooth filling          | 0.030<br>(-0.003, 0.063)                 | <b>0.022</b><br><b>(0.007, 0.036)</b> | <b>0.017</b><br><b>(0.004, 0.031)</b> | <b>0.016</b><br><b>(0.002, 0.030)</b> | <b>0.015</b><br><b>(0.002, 0.029)</b> | 0.003<br>(-0.013, 0.019)  | 0.008<br>(-0.008, 0.023)  | -0.002<br>(-0.006, 0.003) | 0.01<br>(-0.001, 0.027)   | 0.005<br>(-0.007, 0.018)  |

**Abbreviations:** CI, confidence interval; **MoCA-T**, Taiwanese version of the Montreal Cognitive Assessment. Numbers in bold indicate significant findings ( $P < 0.05$ ). The three oral variables were treated as continuous variables. Each score of domain-specific cognition was a standardized Z score. All models were adjusted for age, sex, follow-up time, practice times, years of education, apolipoprotein E  $\epsilon 4$  status, depressive symptoms, body mass index, diabetes mellitus, smoking, diet quality, gait speed, interleukin 6, and *Helicobacter pylori*.

Conclusions

► Over time, we found that **less gingivitis severity** and a **higher number of filled teeth** were associated with **better global cognition** and **memory performance**, respectively.

► These findings suggest that regular oral health assessment may offer a practical strategy for the early detection and prevention of cognitive impairment among community-dwelling older adults.

Acknowledgement

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