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Efficacy of Oral Health Interventions on Cognitive Function in Patients with Alzheimer's Disease: a Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202550076

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 25 May 2025 and was last updated on 27 May 2025.

INTRODUCTION

eview question / Objective The objective of this study is to systematically evaluate the impact of oral health interventions on the cognitive function of patients with Alzheimer's disease, with a specific focus on the following questions: Among Alzheimer's patients receiving oral health interventions, how does their cognitive function (assessed via MMSE or MoCA) differ from those who receive no intervention or conventional interventions? We will explore the effects of different types of oral health interventions on cognitive function and analyze whether these effects vary based on patients' baseline characteristics. Through this research, we aim to provide empirical support for improving the overall health status of Alzheimer's disease patients.

Condition being studied Alzheimer's disease (AD) is a common neurodegenerative disorder that affects the cognitive function and quality of life of millions of people worldwide. In recent years, the relationship between oral health and cognitive function has received increasing attention, and it

has been suggested that poor oral health may be associated with cognitive decline. However, there is a lack of systematic assessment of the effects of oral health interventions on cognitive function in patients with Alzheimer's disease. By synthesizing and analyzing the existing literature, we can better understand the potential of oral health interventions in improving cognitive functioning, especially the differences in effects under different intervention). This study will provide an important basis for future clinical practice and public health policy.

METHODS

Search strategy The search strategy for PubMed will include the following keywords and MeSH terms: ("Alzheimer's Disease" OR "Alzheimer disease" OR "dementia") AND ("oral health" OR "oral hygiene" OR "dental care") AND ("cognitive function" OR "MMSE" OR "MoCA"). The search will be limited to studies published in English. The search will include studies published from the

inception of each database up to the cutoff date of May 26, 2025.

Participant or population Alzheimer's Disease

Intervention Oral Health Interventions.

Comparator Receive no intervention or conventional interventions.

Study designs to be included Randomised studies.

Eligibility criteria The study will include participants diagnosed with Alzheimer's disease, aged 60 years and older, who are receiving either no intervention or standard oral health interventions. Studies must evaluate cognitive function using either the Mini-Mental State Examination (MMSE) or the Montreal Cognitive Assessment (MoCA). Eligible studies will be randomized controlled trials, cohort studies, or case-control studies published in English. Exclusion criteria will include studies focusing on populations with other types of dementia, those with severe comorbidities affecting cognitive function, or studies that do not report on cognitive outcomes.

Information sources The search will include studies published from the inception of each database up to the cutoff date of May 26, 2025. Information sources will include electronic databases such as PubMed, Embase, Web of Science, the Cochrane Library, and Dentistry and Oral Sciences. Additionally, trial registers and grey literature sources will be consulted, along with direct contact with study authors for unpublished data.

Main outcome(s) The primary outcome will be the change in cognitive function levels, measured by standardized cognitive assessments(MMSE/MoCa).

Data management Data management will be conducted using reference management software to organize and track studies throughout the review process. The selection process will involve two independent reviewers screening titles and abstracts, followed by full-text reviews to determine eligibility. Discrepancies will be resolved through discussion or consultation with a third reviewer. Data collection will be performed using piloted forms, with data extracted independently and in duplicate to ensure accuracy. Quality assessment / Risk of bias analysis Risk of bias will be assessed using the Cochrane Risk of Bias Tool for randomized trials and the Newcastle-Ottawa Scale for observational studies. This assessment will be conducted at both the study and outcome levels. The information will be used to inform the synthesis of data and to interpret the robustness of the findings.

Strategy of data synthesis Data will be quantitatively synthesized if appropriate, using random-effects meta-analysis to account for variability across studies. Summary measures will include mean differences for continuous outcomes (cognitive function and CGI scores) with 95% confidence intervals. Heterogeneity will be assessed using l² statistics. Additional analyses may include sensitivity analyses to explore the impact of study quality and subgroup analyses based on intervention type. If quantitative synthesis is not feasible, a narrative synthesis will be provided.

Subgroup analysis Subgroup analyses will be performed to explore differences based on the type of oral health intervention (e.g., dental care, oral hygiene education) and the cognitive assessment tools used (e.g., MMSE, MoCA). This will allow us to investigate whether certain interventions are more effective than others in improving cognitive outcomes.

Sensitivity analysis Sensitivity analyses will be conducted to assess the robustness of the synthesized results by excluding studies at high risk of bias and examining the influence of individual studies on the overall effect size.

Language restriction only English.

Country(ies) involved The study was conducted in China, and the research team consisted of scholars from the Shanghai Jiading District Mental Health Center in China.

Keywords Alzheimer's Disease, Oral Health Interventions, Cognitive Function, MMSE, MoCA.

Contributions of each author

Author 1 - Yi Wang. Author 2 - Cheng Cheng. Author 3 - Hongyan Gao. Author 4 - Yanli Han. Author 5 - Huimin Wu. Author 6 - Yi Wen. Author 7 - CX Ban.