

Prediction Models for Cognitive Impairment Risk in Hypertensive Patients: A Systematic Review and Meta-analysis

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ADMINISTRATIVE INFORMATION**Support** - NSFC: 82104976, 82074516.**Review Stage at time of this submission** - Preliminary searches.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202490070**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 September 2024 and was last updated on 17 September 2024.**INTRODUCTION**

Review question / Objective Hypertension is a primary risk factor for cardiovascular disease and is becoming increasingly widespread globally. In 2010, it was estimated that 31.1% of adults, or approximately 1.39 billion people, were affected by hypertension. The prevalence was 31.9% in the United States and 41.7% in China. Cognitive impairment may be induced by hypertension, with studies indicating that two-thirds of individuals over 60 with hypertension are at an elevated risk for vascular cognitive impairment. Cognitive impairment represents a transitional phase between normal cognitive function and dementia. Over time, cognitive impairment can lead to reduced daily functioning, diminished quality of life, and greater burdens on families and societal resources. Consequently, early detection of cognitive impairment in hypertensive patients, coupled with targeted interventions, is vital for preventing and managing cognitive dysfunction.

Recent research has increasingly focused on assessing and preventing cognitive impairment in hypertensive patients. Predictive models for cognitive impairment can identify early changes in cognitive function among hypertensive individuals, facilitating timely interventions to prevent dementia and lessen the economic impact on families and society. Various risk prediction models have been developed using factors such as demographic information, blood markers, gut microbiota, and mental health status. However, these models vary in their quality, predictive accuracy, and clinical applicability. This study aims to systematically review and critically appraise these risk prediction models, evaluating their performance, potential biases, and practical relevance. The goal is to provide insights that will aid in the development and implementation of effective models and offer evidence-based recommendations for the prevention and treatment of cognitive impairment in hypertensive patients.

Condition being studied This study aims to systematically review and critically appraise these risk prediction models, evaluating their performance, potential biases, and practical relevance. The goal is to provide insights that will aid in the development and implementation of effective models and offer evidence-based recommendations for the prevention and treatment of cognitive impairment in hypertensive patients.

METHODS

Search strategy We will conduct a systematic search across several databases, including PubMed, Embase, Cochrane Library, Web of Science, Chinese Biomedical Literature Database (CBM), China National Knowledge Infrastructure (CNKI), Chinese Science and Technology Periodical Database (VIP), and Wanfang Database, covering studies from inception to the present.

Our search strategy will employ both Medical Subject Headings (MeSH) and free-text terms related to hypertension, prediction models, and Cognition. Additionally, we will manually search gray literature, review reference lists of relevant studies, and explore pertinent websites (e.g., <http://www.chictr.org.cn>, <http://www.ClinicalTrials.gov>). We will also consult with experts in the field to ensure comprehensive coverage.

Participant or population Patients were diagnosed with hypertension according to internationally recognized clinical guidelines or consensus, such as the Chinese Guidelines for Prevention and Treatment of Hypertension (2018 Revised Version), and the 2020 International Society of Hypertension Global Hypertension Practice Guidelines. There were no restrictions regarding gender or race.

Intervention None.

Comparator None.

Study designs to be included The study will include cohort studies, case-control studies, and cross-sectional studies.

Eligibility criteria

Exclusion Criteria

1. Studies that do not specify the criteria for diagnosing cognitive impairment.
2. Research that only analyzes risk factors without establishing a prediction model or describing the model development process.
3. Models based on a single predictor variable.

4. Articles that cannot be accessed in full, contain incomplete information, or from which data cannot be extracted.

5. Articles published in languages other than Chinese or English.

6. For duplicate publications, exclude those with earlier publication dates or smaller sample sizes.

Information sources We will perform a systematic search on PubMed, Embase, Cochrane Library, Web of science, Chinese Biomedical Literature Database (CBM), China National Knowledge Infrastructure (CNKI), Chinese Science and Technology Periodical Database (VIP), and Wanfang database (Wanfang Data), from inception onwards.

Main outcome(s) The outcome measure is cognitive impairment, which includes various degrees of impairment such as mild cognitive impairment and dementia. All types of cognitive impairment are considered.

Quality assessment / Risk of bias analysis Two independent evaluators will use the Prediction Model Risk of Bias Assessment Tool (PROBAST) to assess the risk of bias in prediction models. This tool evaluates potential biases across four domains: participants, predictors, outcome, and analysis.

Strategy of data synthesis Descriptive analysis methods were used to summarize the data.

Subgroup analysis None.

Sensitivity analysis None.

Country(ies) involved China.

Keywords Hypertension, Cognitive impairment, Prediction model, Systematic review, Meta-analysis.

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