INPLASY

Impact of Comorbidities on the Prognosis of Sudden Sensorineural Hearing Loss: A Systematic Review and Meta-Analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 7 April 2026 and was last updated on 7 April 2026.

INTRODUCTION

Review question / Objective To systematically evaluate the impact of common comorbidities, including diabetes mellitus, hypertension, dyslipidemia, and cardiovascular disease, on the prognosis of patients with sudden sensorineural hearing loss (SSNHL), and to provide evidence-based reference for clinical prognostic risk stratification and individualized intervention.

Condition being studied Sudden Sensorineural Hearing Loss (SSNHL).

METHODS

Search strategy Literature published from 2010 to 2025 was retrieved from databases including PubMed, Cochrane Library, Web of Science, and Embase. The search was conducted using Medical Subject Headings (MeSH) in combination with the following free-text terms: Sudden sensorineural hearing loss; Hearing Loss, Sudden; Sudden Hearing Loss; Diabetes Mellitus; Diabetes; Hypertension; High Blood Pressure; Hyperlipidemia; Hyperlipemia; Dyslipidemia; Lipid Disorders; Coronary Heart Disease; Coronary Artery Disease; Heart Disease; Cardiac Disease; Cerebrovascular Disease; Cerebrovascular Disorders; Old Cerebral Infarction; Chronic Cerebral Infarction. Meanwhile, a manual supplementary search was performed based on the reference lists of the retrieved articles.

Participant or population 6945 patients diagnosed with sudden sensorineural hearing loss (SSNHL) from 19 observational studies, including those with comorbid diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease and non-comorbid controls.

Intervention This is a systematic review and meta-analysis of observational studies. The exposure of interest is the presence of common comorbidities in patients diagnosed with sudden sensorineural hearing loss (SSNHL), including diabetes mellitus, hypertension, dyslipidemia, and cardiovascular

disease. All included patients received standard clinical treatment for SSNHL, mainly including systemic glucocorticoids (methylprednisolone sodium succinate or dexamethasone), with optional adjuvant therapies such as intratympanic dexamethasone injection, ginkgo biloba extract, batroxobin, hyperbaric oxygen, and vasoactive agents.

Comparator SSNHL patients without the above-mentioned corresponding comorbidities (diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease), matched for baseline characteristics and receiving the same standard clinical treatment regimens for SSNHL as the exposure group.

Study designs to be included Retrospective cohort studies and case-control studies (observational studies) that reported the association between common comorbidities (diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease) and hearing prognosis in patients with sudden sensorineural hearing loss (SSNHL). Randomized controlled trials, prospective studies, case reports, reviews, and studies with incomplete data or low methodological quality were excluded.

Eligibility criteria Inclusion Criteria
Studies published in English between January 2010 and December 2025;
Participants met any authoritative national diagnostic criteria for sudden sensorineural hearing loss (SSNHL);
Studies reported hearing prognosis outcomes based on pure tone audiometry (PTA), including response rate (PTA improvement ≥10 dB HL) and complete recovery rate;
Methodological quality assessed by the Newcastle-Ottawa Scale (NOS) with a score ≥6 points.
Exclusion Criteria
Studies with unavailable full text, duplicate publication, or incomplete data that cannot extract valid effect sizes and 95% confidence intervals;
Prospective studies, randomized controlled trials, case reports, reviews, editorials, meeting abstracts and other non-eligible study types;
Non-English literature, studies with inconsistent SSNHL diagnostic criteria or mismatched outcome indicators;
Low-quality studies with NOS score <6 points.

Information sources We systematically searched four electronic bibliographic databases: PubMed, Cochrane Library, Web of Science, and Embase, to identify eligible studies published in English from January 2010 to December 2025. Supplementary manual searches of the reference lists of all included studies and relevant systematic reviews were performed to capture any potentially eligible literature missed by the electronic database search. No grey literature, clinical trial registries, or contact with study authors for unpublished data were involved in this systematic review.

Main outcome(s) The primary outcomes are hearing prognosis of patients with sudden sensorineural hearing loss (SSNHL) after standard treatment, assessed at the end of follow-up (range: 14 days to 365 days) via pure tone audiometry (PTA):
Response rate: Defined as an improvement in PTA ≥10 dB HL. The effect measure is odds ratio (OR) with 95% confidence interval (CI), to evaluate the impact of diabetes mellitus, hypertension, dyslipidemia, and cardiovascular disease on SSNHL response rate.
Complete recovery rate (cure rate): Defined as PTA restored to ≤25 dB HL. The effect measure is OR with 95% CI, to assess the association between the above comorbidities and SSNHL cure rate.

Additional outcome(s) The secondary outcomes are the impact of gender and affected side (left ear/right ear) on the hearing prognosis of SSNHL patients, including response rate and complete recovery rate assessed by PTA at the end of follow-up, with odds ratio (OR) and 95% confidence interval (CI) as effect measures.

Data management Literature search results will be imported into EndNote software for deduplication and standardized management. Three independent reviewers will screen literature and extract study characteristics, outcome data and effect sizes in duplicate according to pre-specified criteria, with cross-checking of all results. Any disagreements will be resolved by discussion with a fourth senior reviewer to reach a final consensus. Extracted data will be entered into a standardized Excel database, with double-checking to ensure data accuracy and full traceability of the process.

Quality assessment / Risk of bias analysis Literature search results will be imported into EndNote software for deduplication and standardized management. Three independent reviewers will screen literature and extract study characteristics, outcome data and effect sizes in duplicate according to pre-specified criteria, with cross-checking of all results. Any disagreements will be resolved by discussion with a fourth senior reviewer to reach a final consensus. Extracted data will be entered into a standardized Excel database,

with double-checking to ensure data accuracy and full traceability of the process.

Strategy of data synthesis Meta-analysis will be performed using RevMan 5.4 and Stata 16 software. For dichotomous outcomes (response rate and cure rate), pooled effect sizes will be presented as odds ratio (OR) with 95% confidence interval (CI), with a test level of $\alpha=0.05$. Heterogeneity will be evaluated by Cochran's Q test and I^2 statistic. If $P<0.10$ for Q test and $I^2 \geq 50\%$, the DerSimonian-Laird random-effects model will be applied; if $I^2$5 studies, and trim-and-fill method for analyses with ≤5 studies.

Subgroup analysis Prespecified subgroup analyses will be conducted to explore potential sources of heterogeneity across included studies and verify the robustness of pooled effect sizes, stratified exclusively by the following core factors directly related to the PICOS framework of this review:
Diagnostic criteria for sudden sensorineural hearing loss (SSNHL): BB standard (≥30 dB HL hearing loss in 3 consecutive frequencies), AA standard (≥20 dB HL hearing loss in 2 consecutive frequencies), and other diagnostic criteria;
Definition of hearing response rate: pure tone audiometry (PTA) improvement ≥10 dB HL, PTA improvement ≥15 dB HL, and other response threshold definitions;
Definition of complete recovery (cure rate): PTA restored to ≤20 dB HL, PTA restored to ≤25 dB HL, and studies without a clear standardized cure definition.
Interaction tests will be used to assess statistically significant differences between subgroups, with a test level set at $P<0.05$.

Sensitivity analysis Sensitivity analysis will be performed using the one-by-one study elimination method to verify the robustness of pooled results. Each individual study will be excluded sequentially, and meta-analysis will be re-conducted with the remaining studies. The consistency between the re-pooled effect size and the original overall result will be compared to evaluate the influence of a single study on the combined conclusion. Results will be considered stable if the pooled effect size and statistical significance do not change substantially after sequential exclusion.

Language restriction Yes, only English-language published studies will be included.

Country(ies) involved China (People's Republic of China).

Other relevant information This study aims to provide high-quality evidence-based reference for clinical prognostic risk stratification and individualized comprehensive intervention of SSNHL patients, by quantitatively evaluating the impact of common cardiovascular and metabolic comorbidities on SSNHL hearing prognosis.

Keywords sudden sensorineural hearing loss; meta-analysis; prognosis; risk factors; comorbidities.

Dissemination plans The findings will be published in a peer-reviewed international journal focused on otolaryngology or clinical epidemiology. Results will also be presented at national and international academic conferences. The full protocol and review will be shared on open-access platforms to ensure wide dissemination to clinicians and researchers.

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