INPLASY PROTOCOL

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Review Stage at time of this submission: Preliminary searches.

Conflicts of interest:
None declared.

Air pollution and cognitive impairment: A systematic review and meta-analysis

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Review question / Objective: To assess the association between air pollution and cognitive impairment.

Condition being studied: Though many previous researches have been indicated the impact of air pollution on cognitive impairment, there have been some controversies between these studies. In particular, the results differ in different air pollutants. Consequently, the purpose of our study was to conduct a systematical review and meta-analysis, further elucidating the association between air pollution and cognitive impairment.

Information sources: The databases from CNKI, VIP, Wanfang, CBM, Pubmed, Embase, Web of Science and Cochrane Library, which were published from the database before October 2021.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 03 December 2021 and was last updated on 03 December 2021 (registration number INPLASY2021120017).

INTRODUCTION

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METHODS

Participant or population: Adults (age＞18).

Intervention: Include observational studies.

Comparator: Observational studies.

Study designs to be included: Cross-sectional, cohort and case-control studies.

Eligibility criteria: (1) Data from adults (age ＞18);(2) The studies used the formal instrument to assess cognitive impairment; (3) The studies offered the evidence of some assessment of exposure to air pollution (PM2.5, PM10, PM2.5-10, NO2, SO2, CO and O3);(4) The studies provided the odd ratio (OR), risk ratio (RR), 95% confidence interval (95% CI);(5) The study reported outcomes of cognitive impairment.

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Main outcome(s): Incidence of cognitive impairment.

Quality assessment / Risk of bias analysis: The Risk of Bias (RoB) tool for observational studies was the Newcastle-Ottawa Scales (NOS). The NOS allocates a maximum of nine points, with a total of >7 high-quality studies. heterogeneity was evaluated by I2 tests, I2 value of ＜25%, 25-75%, 75% will indicate low, moderate, and high level of heterogeneity, respectively. When the heterogeneity is greater, the source of potential heterogeneity should be further explored. Publication Bias were evaluated by using Egger's test and funnel plot.

Strategy of data synthesis: Taking account of heterogenicity of the methodology, data source and so on existed in the included studies. Accordingly, we pooled the ORs and 95% CIs across the studies using DerSimonian–Laird (random-effects model). We would choose the adjusted OR if it was reported.

Subgroup analysis: By the duration of follow-up, exposure area and study design.

Sensitivity analysis: Sensitivity analyses were conducted to detect the robustness of the outcome. After excluding the studies with lower Downs and Blacks Scales, the studies with higher quality were included in the sensitivity analyses. Meanwhile, sensitivity analyses were conducted by changing the random-effects methods to fixed-effects methods.

Country(ies) involved: China, Mexico, Germany.

Keywords: air pollution, cognitive impairment, Odd ratio, Meta-analysis.

Contributions of each author:
Author 1 - Meiling Zheng.
Author 2 - Feng Feng.
Author 3 - Yanqian Liu.
Author 4 - Cuiling Feng.