

Title: Influence of coal-derived air pollutants on cognitive and neurobehavioural function among children

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Round 1

Reviewer A: Koushik Ahmed, ORCID: 0009-0000-6908-9267, COI: None, AI disclosure: ChatGPT and QuillBot have been used for summarizing content and grammatical improvement.

- 1. Comment** The methodology requires further clarification, particularly regarding participant recruitment, exposure assessment, and the justification for categorizing distances from coal-fired power plants.

Response: The Methods section has been revised to provide additional clarification regarding participant recruitment procedures, exposure assessment methodology, and the rationale for categorizing residential proximity (within 10 miles and beyond 40 miles) from coal-fired power plants based on prior environmental exposure literature and local geographic distribution patterns. Relevant explanations have been added in the revised manuscript (Lines 66-68, 72-76).
- 2. Comment** Several potentially important confounding variables, including socioeconomic status, parental education, nutrition, and school environment, were not controlled for and should be discussed more thoroughly.

Response: Additional statements have been included in the limitations section acknowledging that socioeconomic status, parental education, nutrition, school environment, and related demographic variables were not controlled in the present study and may have influenced the observed outcomes. The discussion has been revised accordingly to avoid overinterpretation (Lines 93-95).
- 3. Comment** The discussion section should compare the present findings more extensively with previous international studies on air pollution and cognitive outcomes in children.

Response: The Discussion section has been expanded to include comparisons with previous international studies investigating associations between particulate matter exposure, coal-derived pollutants, and neurocognitive outcomes among children. These additions strengthen the contextual interpretation of the present findings (Lines 91,92).
- 4. Comment** There are several grammatical and formatting inconsistencies throughout the manuscript that require careful language editing.

Response: The manuscript has undergone careful grammatical revision and formatting correction throughout the text to improve readability, sentence structure, and consistency according to journal guidelines (Page 3,4).
- 5. Comment** The conclusion should be more balanced by acknowledging the cross-sectional nature of the study and avoiding overly causal interpretations of the findings.

Response: The conclusion has been revised to emphasize the associative nature of the findings and to acknowledge that the cross-sectional study design does not permit causal inference. Causal terminology such as "influence" and "impact" has been replaced with more appropriate associative language where applicable. (Lines 53, 98-99).
- 6. Comment** The table title should be more concise and informative; abbreviations such as MMS and CBCL should be clearly defined in the table footnote, and p-values should be consistently reported.

Response: We thank the reviewer for this valuable suggestion. The table has been revised to improve clarity and readability. The title has been made more concise, abbreviations (MMS and CBCL) are now defined in the footnote, and p-values have been reported consistently. Additionally, confidence intervals and effect size measures have been included where applicable to strengthen the interpretation of the findings (Lines 168, 169).

Reviewer B: Md. Abirul Islam, ORCID: 0009-0004-8198-591X, COI: None, AI disclosure: None

- 7. Comment** No sample size calculation or power analysis is reported. The authors should provide justification for the enrollment of 190 participants.

Response: Additional details regarding sample size estimation, including the assumed effect size, alpha level, and statistical power, have now been incorporated into the Methods section. Furthermore, clarification has been provided regarding participant screening and exclusion procedures that resulted in the final analytical sample of 115 participants (Group A = 61; Group B = 54) from the initially enrolled 190 participants (Lines 56-58, 79-82).
- 8. Comment** Exposure Assessment concerns regarding PM10 monitoring duration and spatial coverage.

Response: The manuscript has been revised to clarify the placement and purpose of the personal modular impactor and to acknowledge that one-week PM10 monitoring may not fully represent long-term chronic exposure. This limitation has now been explicitly discussed in the revised manuscript (Lines 72-76, 94-95).

9. Comment The CBCL reference is incorrect.

Response: Thank you for identifying this referencing error. The incorrect citation has been removed and replaced with the original validated reference for the Child Behavior Checklist (CBCL) developed by Achenbach and colleagues. The reference section has been updated accordingly (Line 165).

Reviewer E: Rajan Talukder, ORCID: 0000-0001-6325-2617, COI: None, AI disclosure: I used Grammarly, Claude, and ChatGPT to organize and clarify. Judgments and final recommendations are my own.

10. Comment Line 58: "> 10 years" exposure impossible for children aged 8–12.

Response: The statement has been corrected to reflect age-appropriate residential exposure duration consistent with the participant age range (Line 61).

11. Comment 190 enrolled vs. 115 analyzed.

Response: Thank you for the observation. Clarification regarding participant screening, eligibility assessment, and exclusion criteria has now been added to explain the reduction from 190 enrolled participants to the final analytical sample of 115 participants (Lines 79-82).

12. Comment CBCL p = 1.00 implausible.

Response: The statistical analysis was rechecked, and the CBCL p-value has been corrected in the revised manuscript (Lines 86, 87, 169).

13. Comment Below 25th percentile on TDE as inclusion criterion biases results.

Response: Additional justification has been provided explaining that the TDE subset screening was used to identify children with potential academic performance concerns relevant to neurocognitive evaluation. This limitation and the possibility of selection bias have also been acknowledged in the Discussion section (Lines 59,60).

14. Comment Rationale for 10 vs. 40-mile cutoff.

Response: We appreciate the reviewer's suggestion. Additional explanation regarding the geographical categorization and environmental exposure rationale for the selected residential distance cutoffs has been added in the Methods section (Lines 66-68).

15. Comment One week PM monitoring cannot represent chronic exposure.

Response: Thank you for this important observation. The limitation of short-duration PM10 monitoring has now been acknowledged explicitly in the manuscript, and recommendations for long-term environmental exposure monitoring in future studies have been added (Lines 94,95).

16. Comment Confounders not measured.

Response: We appreciate this valuable comment. The limitations section has been expanded to acknowledge that variables such as socioeconomic status, parental education, school quality, and related environmental influences were not evaluated and may have contributed to the observed findings (Lines 93,94).

17. Comment Replace causal language.

Response: Causal terms including "influence" and "impact" have been revised throughout the manuscript and replaced with associative terminology to better reflect the cross-sectional study design (Lines 53,100).

Responsible editor: M Mostafa Zaman, ORCID: 0000-0002-1736-1342

18. Comment Methods over-detailed; Results require elaboration.

Response: The Methods section has been condensed, and the Results section has been revised with clearer elaboration of the study findings while maintaining the journal's prescribed word limit (Lines 77-89).

Responsible editor: M Mostafa Zaman, ORCID: 0000-0002-1736-1342

Round 2

1. Comment The manuscript should be organized in IMRD format and lacks sufficient discussion.

Response: The manuscript has been reorganized according to the IMRD structure, and a comprehensive Result section based on the study findings has been added. (lines 68 - 75)

2. Comment The group assignment is unclear and the study design requires justification.

Response: Group A comprised children residing within 10 miles of a coal-fired power plant, while Group B comprised children residing more than 40 miles away. The study is classified as a cross-sectional study because exposure and outcome data were collected simultaneously at the individual level residing in a selected communities without follow-up. This clarification has been added (Lines 43-45).

3. **Comment** Include group names in the tables.
Response: Group R and Group B have been added as column headings in all relevant tables (Line 164).
4. **Comment** The Introduction section should be shortened (Lines 29-46).
Response: The Introduction has been revised and condensed while retaining key background information (Lines 29 - 42).
5. **Comment** The study population size is repeated.
Response: The duplicate statement has been removed and retained only once (Line 50).
6. **Comment** Inconsistency in age ranges (4-17 years vs. 8-12 years).
Response: The age range has been corrected and made consistent throughout the manuscript.
7. **Comment** Statements in lines 49–54 belong in the Discussion.
Response: These statements have been moved to the Discussion section (Lines 86 -89).
8. **Comment** Clarify how assessments for Group A and Group B were conducted.
Response: A detailed description of the assessment procedures has been added to the Methods section and discussion section. Following eligibility screening using the arithmetic and spelling subsets of the TDE, cognitive function was evaluated using the Mini Mental State Examination for Children and neurobehavioral outcomes were assessed using the Child Behaviour Checklist (CBCL). Both groups underwent identical evaluation procedures using the same assessment tools and protocols (Lines 47, 48, 78, 79).
9. **Comment** The manuscript lacks a proper Discussion section.
Response: A detailed Discussion section interpreting the study findings and comparing them with existing literature has been incorporated (Lines 76 - 98).
10. **Comment** Include the age of the children in the MMS score table.
Response: Age characteristics of the participants have been included in the table (Line 164).