

Global And Regional Trends In Air Pollution- attributable Alzheimer Disease And Other Dementias Burden (1990-2023)

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Despite modest declines in air-pollution attributable Alzheimer disease and other dementias, there is a significant discrepancy between high and low income regions highlighting the need for targeted air pollution mitigation and risk reduction strategies for dementia in resource-limited regions.

INTRODUCTION

Alzheimer disease and other dementias (ADOD) are major contributors to global morbidity and mortality. Environmental risks, such as air pollution, have been implicated in neurodegenerative processes through mechanisms such as neuroinflammation and oxidative stress. This study maps the overlooked global and regional trends of pollution-linked dementia from 1990 to 2023.

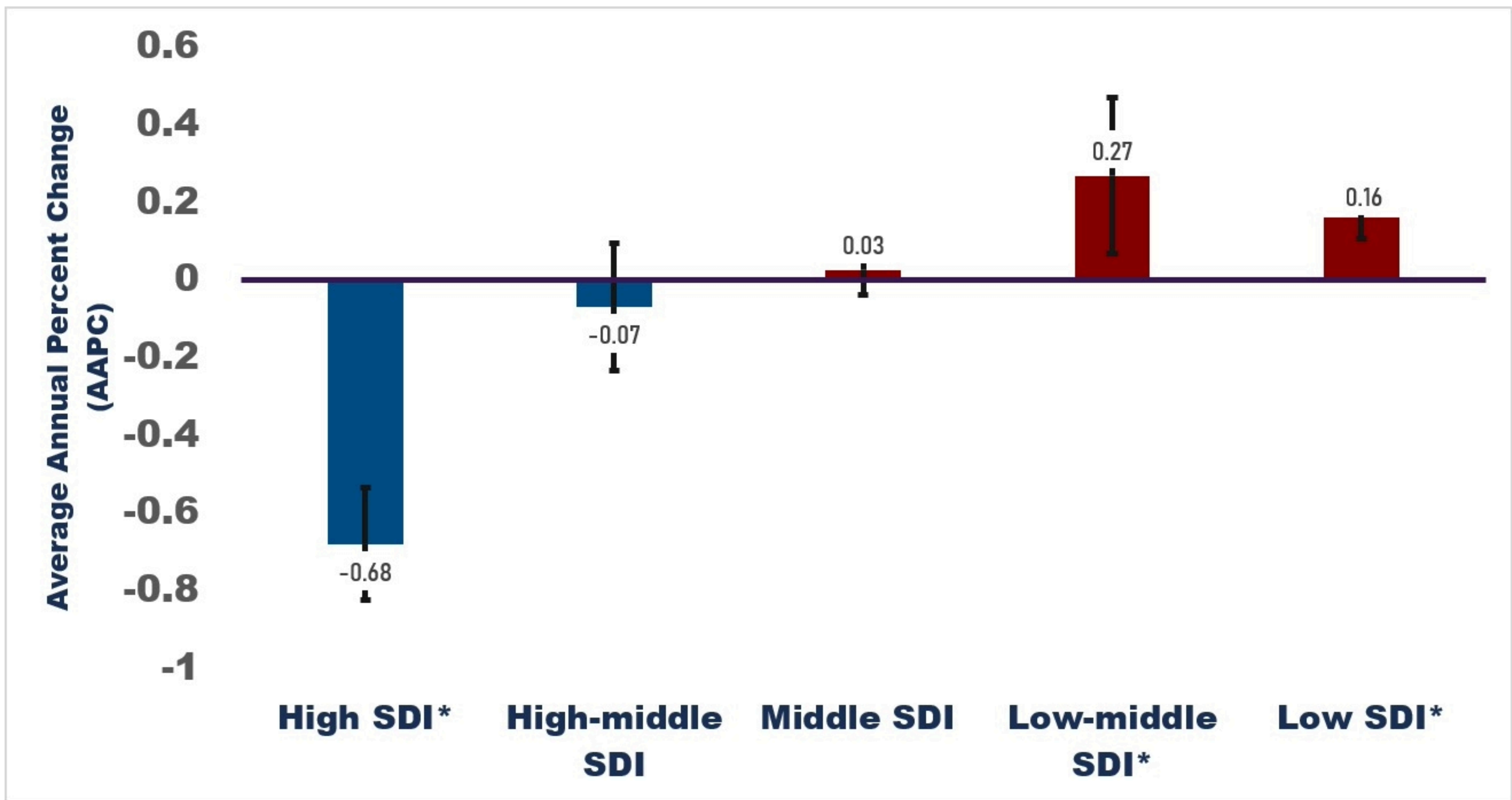
METHODS

- **Data Source:** Abstracted from the Global Burden of Disease (GBD) 2023
- **Metrics:** Analyzed age-standardized death rates (ASDR) from 1990–2023, as well as Disability-Adjusted Life Years (DALYs) from 1990–2023.
- **Analysis:** Temporal trends were assessed using Joinpoint regression to compute the Average Annual Percentage Change (AAPC) with 95% Confidence Intervals (CI).

RESULTS

- Globally ASDR attributable to air pollution in ADOD declined modestly from 1990-2023 (AAPC -0.31%, 95% CI -0.44 to -0.17), with a significant decrease from 2002 to 2019.
- High SDI regions showed significant declines (AAPC -0.71%), whereas low and low-middle SDI regions demonstrated increasing trends. Regionally, ASDR increased in the Middle East and North Africa and Sub-Saharan Africa.
- For DALYs, global rates also declined (AAPC -0.33%, 95% CI -0.45 to -0.22), with patterns similar to ASDR. High SDI and high-income regions showed significant reductions, whereas low and lower-middle SDI/income groups experienced increasing trends. Regional trends were similar to those of ASDR.

Average Annual Percent Change in Disability-Adjusted Life Years (1990-2023)



*Indicates a statistically significant trend (P < 0.05). Error bars represent 95% Confidence Intervals.

CONCLUSIONS

- Despite modest global declines in air pollution-attributable dementia burden, substantial disparities persist.
- Improvements are concentrated in high-income regions, while low- resource settings continue to experience increasing burden.
- These findings highlight widening global inequalities and indicate the need for targeted air pollution mitigation and dementia prevention strategies in vulnerable regions

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