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ABSTRACT E-BOOK

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Neurologic and Mental Health Outcomes » Neurodegenerative outcomes

Greenness, cognitive impairment and dementia: a systematic review and meta-analysis

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BACKGROUND AND AIM: Many recent studies identified the benefits of green space exposure for the improvement of human health, especially mental health. The involved pathways could be increased physical activity, improved sleep quality, reduced stress and also increased social interaction. The relation between greenness and cognitive decline, however, is still uncertain.

METHODS: We searched epidemiological studies related to green space exposure and cognitive impairment and dementia in two electronic databases (PubMed and EMBASE) using terms related to residential greenness, including Normalized Difference Vegetation Index-NDVI, land cover, land use, green index, greenness, green space, urban park, urban green and recreational park, along with cognitive impairment, decline and dementia. A meta-analysis comparing the highest versus the lowest greenness exposure and risk of cognitive decline was performed using a random-effects model.

RESULTS: Out of 64 studies retrieved from the online search 11 studies were eligible for the review. The majority of included reports used satellied-derived NDVI, while the remaining studies used land cover maps to determine the greenness-related exposure areas. Cognitive impairment or dementia risk are calculated using different exposure types (greenness within a buffer, the areal radius, or greenness of census block) at subject residential address. Overall, summary risk ratio-RR showed no effect of greenness on cognitive decline (RR 0.99, 95% confidence interval-CI 0.91-1.07), whereas a slight indication of a beneficial effect of NDVI emerged (RR 0.96, 95%CI 0.90-1.03). Two studies that reported correlation coefficients only did not suggest an association between cognitive impairment and dementia measurement.

CONCLUSIONS: Overall, our study yielded limited evidence of a protective effect of greenness on cognitive decline. The rapid evolution of greenness definition over time and the limitations in exposure assessment, however, suggest the need to further investigate this issue in order to draw more reliable conclusions.

Keywords: Green space, Neurodegenerative outcomes, Environmental epidemiology