

Environmental exposures increase the risk of distal sensorimotor polyneuropathy particularly in people with obesity

Aims: This study aims to assess the association between environmental long-term exposures (low ambient air temperature, low level of greenness, high traffic road noise and high air pollution which have shown previous associations with cardiometabolic and/or neurological diseases) with incident distal sensorimotor polyneuropathy (DSPN) in particular in people with obesity.

Methods: This was a prospective study of 423 individuals aged 62–81 years without DSPN which was based on data from the population-based Cooperative Health Research in the Region of Augsburg (KORA) F4 (2006–2008) and the KORA FF4 surveys (2013–2014).

Results: 188 participants developed clinical DSPN (assessed by the Michigan Neuropathy Screening Instrument) during 6.5 years of follow up. In the entire cohort, the co-occurrence of an interquartile range (IQR) decrease in temperature of the warm season and in normalized difference vegetation index (NDVI) in a 100-m buffer and of an IQR increase in night-time average traffic noise and in annual average particle number concentration (PNC) was positively associated with incident DSPN (cumulative risk index [CRI] [95 % CI] 1.39 [1.02, 1.91]). Effect estimates for exposure combinations were generally higher in individuals with obesity (CRI 1.34–2.01) than in those without obesity (CRI 0.90–1.33). The four-exposure model showed a twofold increased risk of DSPN among obese (CRI [95 % CI] 2.01 [1.10, 3.67]), but not among non-obese individuals (CRI [95 % CI] 1.18 [0.83, 1.67]).

Conclusion: The joint exposure to ultrafine particle concentration, lower air temperature during the warm season, less residential greenness and higher night-time average traffic noise were associated with an increased risk of DSPN. People with obesity appeared more susceptible with a 2-fold increased risk for DSPN when the risk factors were assessed in a joint model.

Comments. There are currently no FDA approved treatments to halt or reverse DSPN with the management focusing on risk factor identification and treatment of modifiable risk factors to reduce the development or progression of this condition. It is therefore paramount that we highlight risk factors as even with controlling those we currently know DSPN still occurs and progresses in certain individuals. This study highlights a further risk factor of environmental exposures that may be involved alongside the other risk factors in the development of DSPN suggesting that multi-exposure approaches are needed to better understand independent and additive effects on the development of DSPN. It further highlights that people with obesity are at even more risk making them more susceptible to these exposures. Thus, addressing obesity in the paradigm of DSPN management is paramount. It also highlights the need for a more holistic approach to the management of DSPN where lifestyle, socioeconomic and environmental factors are addressed simultaneously.

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Reference. Herder C, Zhang S, Wolf K, Maalmi H, Bönhof GJ, Rathmann W, Schwettmann L, Thorand B, Roden M, Schneider A, Ziegler D, Peters A. Environmental risk factors of incident distal sensorimotor polyneuropathy: Results from the prospective population-based KORA F4/FF4 study. *Sci Total Environ.* 2023 Feb 1;858(Pt 3):159878. doi: 10.1016/j.scitotenv.2022.159878. Epub 2022 Nov 1. PMID: 36328258.

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