Association between night-time road traffic noise and perturbations in glucose control may be modified by sleep-related parameters

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ABSTRACT

Given the limited understanding of the glycaemic effects of noise, we assessed the modifying effects of sleep-related parameters [genetic risk for melatonin dysregulation (GRMD) and self-reported sleep problems (SRSP)] on the association between night-time road traffic noise (RTN) and subsequent change in glycosylated haemoglobin (ΔHbA1c).

We prospectively assessed 2142 participants of the Swiss SAPALDIA study who did not change their residence between two study time-points in 2001 and 2010/2011. For 2001, annual RTN (Lnight; 23-07hours) was calculated by validated Swiss noise models and assigned to participants based on the most-exposed façade of their residential floors. GRMD was computed as a score of six common MTNR1B variants. Participants reported on sleep problems and diabetes status. ΔHbA1c was computed as the difference between HbA1c measured in 2010/2011 and 2001. Using linear mixed models, we investigated the association between Lnight and ΔHbA1c, and modification by sleep-related parameters.

RTN Lnight exposure increased mean HbA1c regardless of diabetes status. This increase was significantly modified by GRMD and SRSP in diabetic participants where noise may impact on glucose control through sleep-related pathways.