Short-term nighttime wind turbine noise and cardiovascular events: A nationwide case-crossover study from Denmark - DTU Orbit (24/01/2019)

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Aims: The number of people exposed to wind turbine noise (WTN) is increasing. WTN is reported as more annoying than traffic noise at similar levels. Long-term exposure to traffic noise has consistently been associated with cardiovascular disease, whereas effects of short-term exposure are much less investigated due to little day-to-day variation of e.g. road traffic noise. WTN varies considerably due to changing weather conditions allowing investigation of short-term effects of WTN on cardiovascular events. Methods and results: We identified all hospitalisations and deaths from stroke (16,913 cases) and myocardial infarction (MI) (17,559 cases) among Danes exposed to WTN between 1982 and 2013. We applied a time-stratified, case-crossover design. Using detailed data on wind turbine type and hourly wind data at each wind turbine, we simulated mean nighttime outdoor (10\(^\text{th}\) to 10,000 Hz) and nighttime low frequency (LF) indoor WTN (10\(^\text{th}\) to 160 Hz) over the 4 days preceding diagnosis and reference days. For indoor LF WTN between 10 and 15 dB(A) and above 15 dB(A), odds ratios (ORs) for MI were 1.27 (95% confidence interval (CI): 0.97\(^\text{th}\)-1.67; cases = 198) and 1.62 (95% CI: 0.76\(^\text{th}\)-3.45; cases = 21), respectively, when compared to indoor LF WTN below 5 dB(A). For stroke, corresponding ORs were 1.17 (95% CI: 0.95\(^\text{th}\)-1.69; cases = 166) and 2.30 (95% CI: 0.96\(^\text{th}\)-5.50; cases = 15). The elevated ORs above 15 dB(A) persisted across sensitivity analyses. When looking at specific lag times, noise exposure one day before MI events and three days before stroke events were associated with the highest ORs. For outdoor WTN at night, we observed both increased and decreased risk estimates. Conclusion: This study did not provide conclusive evidence of an association between WTN and MI or stroke. It does however suggest that indoor LF WTN at night may trigger cardiovascular events, whereas these events seemed largely unaffected by nighttime outdoor WTN. These findings need reproduction, as they were based on few cases and may be due to chance.

General information
State: Published
Organisations: Department of Wind Energy, Resource Assessment Modelling, Meteorology & Remote Sensing, Danish Cancer Society, Aarhus University
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Number of pages: 7
Pages: 160-166
Publication date: 2018
Peer-reviewed: Yes

Publication information
Journal: Environment International
Volume: 114
ISSN (Print): 0160-4120
Ratings:
BFI (2019): BFI-level 2
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Scopus rating (2017): CiteScore 7.32 SJR 2.568 SNIP 2.211
Web of Science (2017): Impact factor 7.297
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 7.33 SJR 2.472 SNIP 2.395
Web of Science (2016): Impact factor 7.088
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 6.49 SJR 2.544 SNIP 2.125
Web of Science (2015): Impact factor 5.929
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 6.54 SJR 2.708 SNIP 2.303
Web of Science (2014): Impact factor 5.559
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 6.06 SJR 2.657 SNIP 2.202