

Abstract citation ID: ckad160.917
The burden of cardiovascular disease associated with PM2.5 exposure in the Portuguese population

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Background:

Exposure to air pollution has been associated with increased mortality, premature mortality, and morbidity. A causal relationship between fine particulate matter (PM2.5) exposure and cardiovascular morbidity and mortality was demonstrated by the American Heart Association. In 2020, exposure to PM2.5 concentrations above limits defined by World Health Organization was responsible for 238,000 and 2,600 premature deaths in the European Union and in Portugal, respectively.

Aim:

To estimate the impact on cardiovascular diseases (CVD) attributable to exposure to PM_{2.5} between 2010 and 2020, expressed as years of life lost (YLL), in Portugal.

Methods:

National Statistics databases were used to collect the number of cardiovascular mortality cases between 2010 and 2020. The atmospheric levels of PM_{2.5} were obtained from Online Database on Air Quality of the Portuguese Environment Agency. When PM_{2.5} data were absent, PM₁₀ data were used to estimate the PM_{2.5} concentration through the ratio: PM_{2.5}/PM₁₀ = 0,65. The burden of disease was estimated as YLL. The YLLs due to PM_{2.5}-associated stroke and IHD in the Portuguese adult population, older than 30 years, were determined using the population-attributable fraction (PAF).

Results:

YLLs per year for stroke and IHD were estimated as 41,489.60 (95% CI: 34,610.68 - 48,368.52) YLL and 27,573.44 (95% CI: 24,939.94 - 30,206.93) YLL respectively. Between 2010 and 2020, the crude number of YLL in mainland Portugal due to PM_{2.5} exposure-associated stroke and IHD decreased. The YLLs for IHD and for stroke are higher for men than for women. However, for stroke, the YLLs do not demonstrate as significant a difference as for IHD.

Conclusions:

These findings provide evidence of the impact of air pollution on human health, which are crucial for decision-making.

Acknowledgments:

This work is funded by FCT/MCTES through national funds to PMCardImpact (EXPL/SAU-PUB/0944/2021).

Key messages:

- Exposure to PM_{2.5} has a significant health impact concerning cardiovascular mortality.
- Estimating burden of disease contributes for the decision making and environmental policies.