Measuring Ambient Air Quality through Air Pollution Annoyance

Researchers have recently assessed the level of annoyance caused by air pollution in 25 cities in 12 Western European countries. They suggest that this indicator of perceived ambient air quality could be useful in locating populations with the most urgent needs for environmental changes.

Air pollution has been one of Europe's main political concerns since the late 1970s, especially as it is a risk factor in respiratory and cardiovascular diseases. Currently, in Europe, the particulate matter in the air is responsible for the loss of 3.6 million life years. Scientists have generally looked at the problem of air pollution by assessing its effects on human health, taking into account home-road distances and individual patterns of daily activity. The subjective concept of annoyance, which is often used for measuring noise and odour, has rarely been used by scientists for measuring air pollution exposure.

In this context, an international team of researchers has investigated the personal and socio-demographic determinants of annoyance due to air pollution. In the framework of the "European Community Respiratory Health Survey" EU-funded project, they interviewed 7,867 persons from 25 cities in 12 countries of Western Europe over the period 1999-2001. On an 11 point scale, respondents were asked how much they are annoyed by outdoor air pollution if they keep the windows open (0: no disturbance, 10: intolerable disturbance).

The authors also collected the interviewees' socio-demographic (gender, age, etc.), respiratory (wheezing, breathlessness while wheezing, etc.) and lifestyle (frequency of physical exercise, smoking, etc.) characteristics. The scientists also registered the air pollution levels in these cities.

Their survey reveals that:

- 43% of the participants reported no annoyance at all (0 on the scale), 43% reported low to moderate annoyance (1 to 5) and 14% reported high annoyance (≥ 6).
- Overall mean annoyance was 2.21, ranging from 0.69 in Northern Europe (in Bergen, Norway) to 4.38 in Southern Europe (Huelva, Spain).
- Female gender, socio-economic class, respiratory outcomes, passive smoking, self-reported car and heavy vehicle traffic are withal factors resulting in greater annoyance.
- Age, education, exercise, smoking and season of the interview appear not to have any effect on the annoyance level.
- Of the 25 centres, the mean annoyance increases as the level of pollution (i.e. particulate matters and sulphur concentrations) increases.

The authors suggest that women might be more sensitive to air pollution because in some cities, they may spend more time at home and thus they may have a better perception of the home environment. In addition, respiratory symptoms make people more sensitive and vulnerable to air pollution. Furthermore, the fact that smokers report less air pollution annoyance might be explained by the fact they tend to have a lower perceived risk of health-related problems and are less concerned about their health.

Overall, the authors highlight that an individual’s perception of air pollution is a key issue in the development of new policies of risk assessment and management. In this context, the concept of annoyance may be a useful and easily obtainable measure of perceived ambient air quality across Europe. This could be helpful in identifying populations with the lowest ambient air quality, requiring environmental changes.

The coordination of ECRHS project [http://www.ecrhs.org] was supported by the European Commission under the Quality of Life programme.


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Theme(s): Air pollution, Environment and health.

Additional information: The EC's LIFE programme co-financs a number of projects dealing with air pollution. The most relevant and recent ones have been grouped into one of more than 30 LIFE thematic project lists. Further air-related LIFE information can also be found in the new LIFE by theme: Air section, presenting air-related LIFE programme publications, further project lists, respective Best Projects, videos, LIFEnews features and project publications.

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