

Health and quality of life of people living near a chemical industrial area

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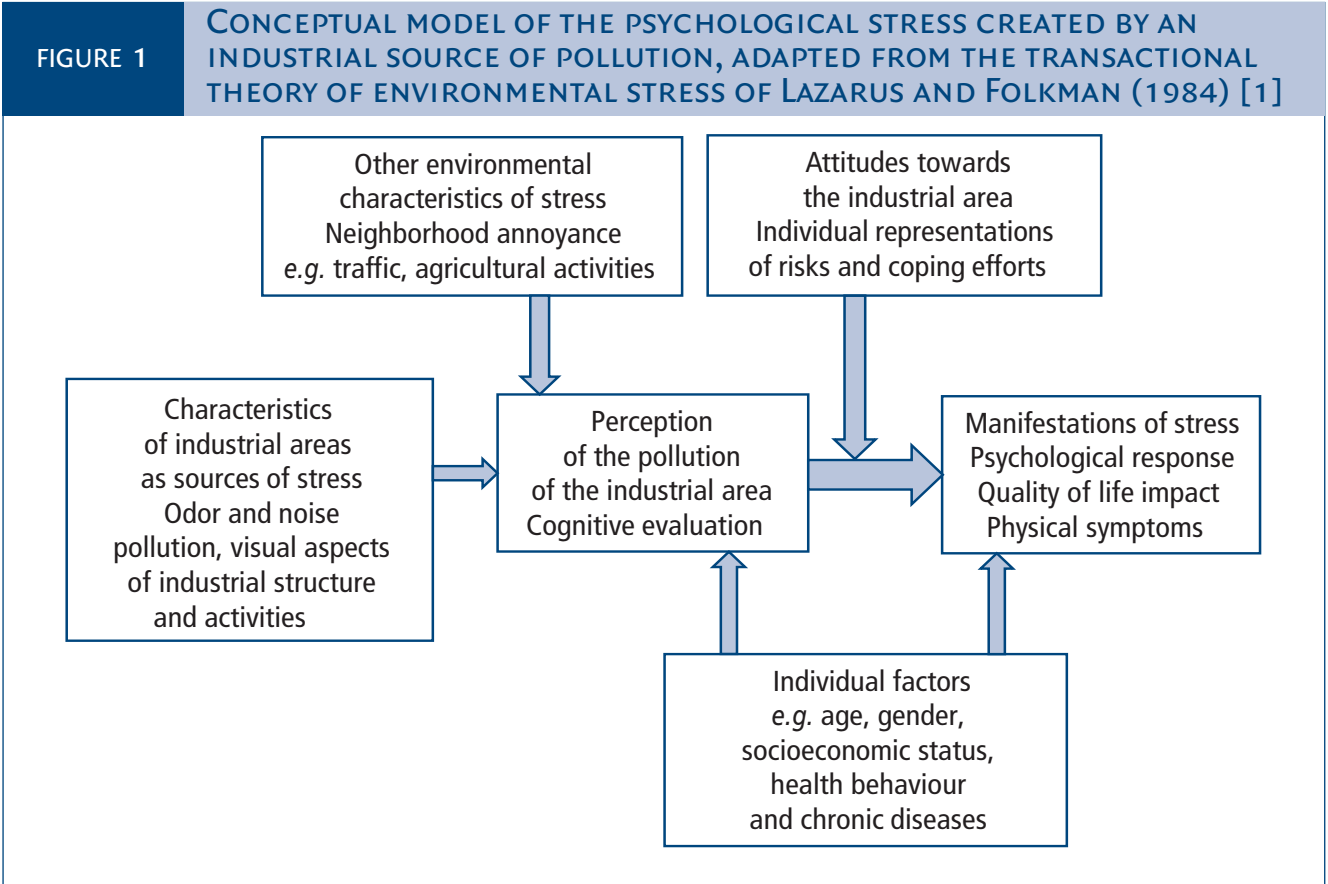
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Research Context

Communities living near industrial areas are not only concerned about the toxicological risks, but also about a set of factors integrating odors, noise, visual aspects and accidental risk events. They usually report health complaints including a wide range of symptoms, self-reported diseases, and poor quality of life.

It is increasingly accepted that the perception of environmental pollution plays a role on well-being and health. The assessment of self-reported health, as a measure of psychological, physical and general health, constitutes a construct to capture the overall effects of environmental factors on the individual's health, in particular psychological and social factors of the environment.

We present the protocol of a study on the health and quality of life of communities living near the major chemical industrial area of Salindres in Gard, France. We study the relation between self-reported health and perception of the pollution modified by the attitudes towards the industrial activities (figure 1).



Survey methods

Population: A cross-sectional phone CATI survey was conducted, in October and December 2012, on a random sample of 1,495 households (52% response rate), representative of the residents of 7 municipalities situated in a 5 km radius around the industrial area (figure 2). The sampling was carried out in a two steps sampling procedure: selection of households based on fixed-line telephone numbers randomly generated and selection of individuals.

Measures: The health indicators are summarized in table.

The exposure to industrial pollution was estimated by people perception of the industrial pollution (intensity and frequency of odors and noise, visual amenity and the pollution perception in the media; 15 items) and by atmospheric pollution modeling (NH₃, PM, NO₂).

Attitudes towards the industrial area assessed believes, worries and behaviors about industrial activities (14 items).

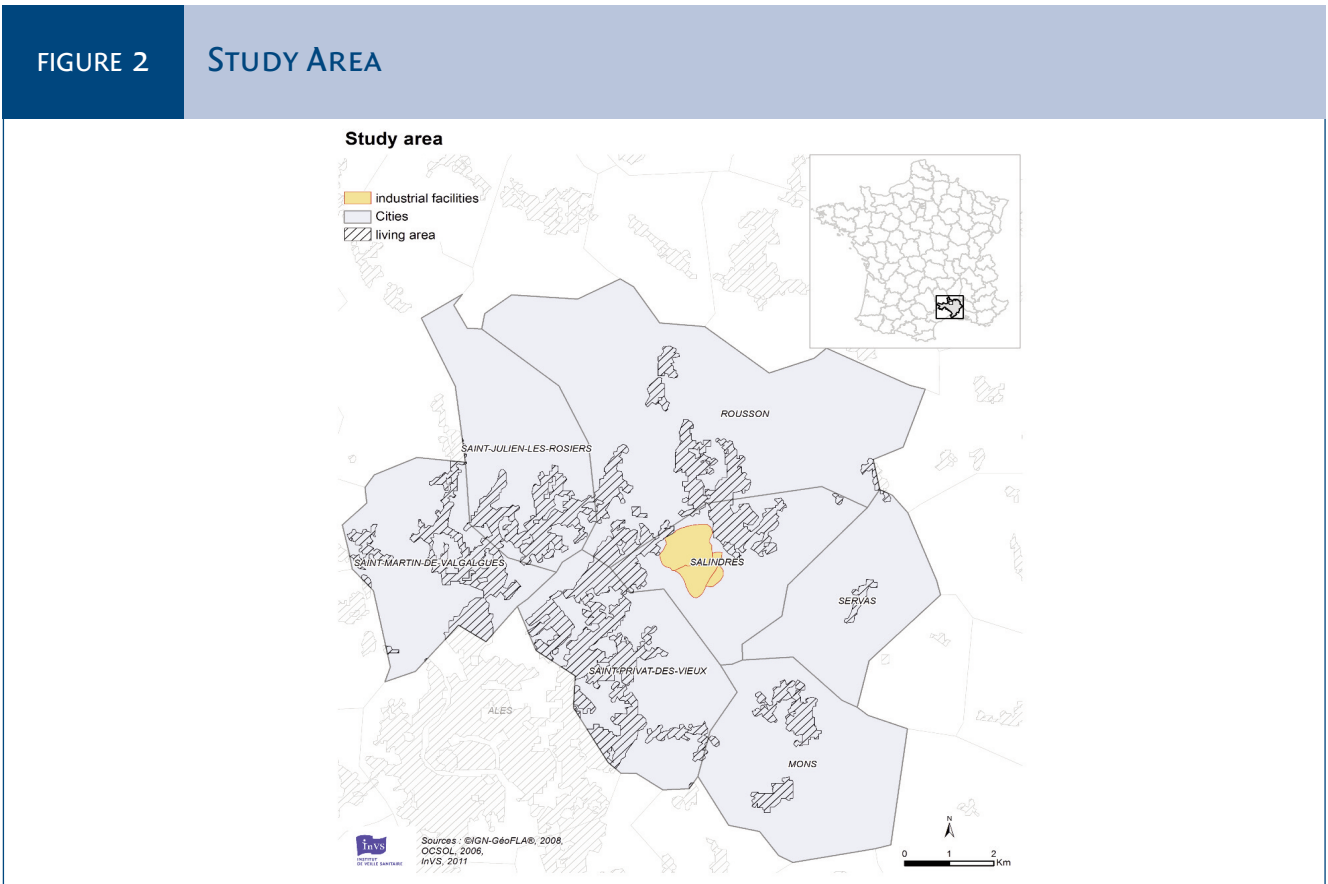


TABLE SELF-REPORTED HEALTH INDICATORS				
Health outcomes	Purpose	Questionnaires	Indicators	Source
General health perception	Measure of different aspects of psychological health of the last 4 weeks, including positive dimensions of health as the well-being	36 items of the standardized instrument Medical Outcomes Study (MOS) Short-Form Health Survey (SF-36) on general perceived health status	Mental Component Summary (MCS) score and the scores of psychological and social dimensions of the questionnaire (i.e. Mental Health and Vitality)	[2,3]
Anxiety	Measure of the anxiety of the last 7 days including general symptoms of anxiety such as nervousness, tension, trembling, feelings of threat, panic attacks and some somatic manifestations of anxiety	10 items of the anxiety dimension (SCL-ANX) of standardized instrument Symptom Check List (SCL-90-R) on general psychological health status	Level of anxiety dimension estimated by the raw score	[4,5]
Sleep disorders (chronic insomnia)	Measure of the presence of chronic insomnia according to the various classifications of sleeping disorders (International Classification of Sleep Disorders (ICSD), Diagnostic and Statistical Manual of Mental Disorders (DSM))	7 items to assess 4 sleep disorders (difficulty in falling asleep, nocturnal awaking, early morning awaking, non-restorative sleep)	Presence of chronic insomnia defined by the fact of having at least a problem of sleep more than 3 nights a week for at least 3 months. It a binary variable diagnostic measure	[6]
Somatic symptoms	Measure of the symptoms which could result from irritating and/or allergenic properties of chemical substances rejected by the industrial activities	10 items on frequency of respiratory symptoms, ENT symptoms (sinus congestion, rhinitis, throat irritation, nose bleeds, earaches), eyes and skin irritation and gastric symptoms (nausea/vomiting)	Number of symptoms occurred more than once during the past 4 weeks	[7,8]

Statistical methods

Construction of instrument:

Confirmatory analysis: Reliability of standardized psychometric instruments (8 dimensions of SF-36 and SCL-ANX dimension) in the study population were checked.

Exploratory analysis: The study associated qualitative (20 semi directive interviews) and quantitative methods (Principal Component Analysis, Cronbach coefficient, step-by-step Cronbach-Mesbah Curve and Rasch Model) to construct and validate instruments to measure the perception of the pollution and attitudes towards the industrial area.

Statistical analysis: Multiple linear regression analysis was used to examine the psychological health indicators (MCS, anxiety, insomnia) in relation to perception of the industrial pollution. Confounding factors were sociodemographic variables (age, gender), socioeconomic status (educational level, socioprofessional status, income, housing), social isolation, health behavior variables (smoking status, alcohol consumption, body mass index) and chronic diseases.

We study two interactions with perception of pollution variable: attitudes towards the industrial activities and length of residence as proxy of habituation effect to the exposure [9].

Sensibility analyses are realized with others exposure indicators to industrial activities: atmospheric pollution modeling and distance to the site. Somatic symptoms are analyzed in relation with atmospheric pollution modeling, controlling for specific confounding factors (e.g. traffic modeling and exposure to other industrial activities).

Conclusion

This study on self-reported health allows considering health indicators rarely taken into account in environmental health around major sources of local pollution. Nevertheless they are influenced by psychosocial factors. These health indicators based on the individual representation of their own health present methodological advantages, in particular in terms of statistical power because of strong prevalence of the symptoms they cover in general population.

The data analysis will be ended in 2013. The utility of this health approach to improve public health management of industrial areas will be assessed.

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