



Health effects of environmental noise pollution on children's health in the region of Aachen

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Dr. med. Jeannette Miriam Horn

Referee: Prof.Dr.Claudia Hornberg

Referee: Prof.Dr.rer.nat.Wolfgang Dott

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Jeannette Horn

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Univ.-Prof. Dr. W. Dott
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Summary

Noise pollution is an environmental stressor with growing importance in regard to public health. Despite a growing interest, a multidisciplinary approach to objectively assess and evaluate noise is still needed. Children are particularly vulnerable to environmental pollutants. Short and long-term data of noise effects on children's health including long-term implications on learning and memory capabilities, which may result in academic disadvantages, need further investigation. As environmental stressors such as noise and air pollution have a lifelong influence on children's health and their entire adult life, it is important to gain further solid multidisciplinary information in order to guide future policy implementations and stakeholders.

More data on the influence of noise on children's health, within different situations, dwellings and times of the day are needed in order to detect most vulnerable groups, locations and settings for noise exposure. Specifically night time noise has been suggested to be harmful for Public Health. Inequity in socioeconomic status (SES) and different coping mechanisms need to be further investigated in order to define most vulnerable groups. Air pollution, as a possible confounder has not been sufficiently controlled for noise pollution. Both pollutants contribute to adverse health effects and act on multiple organ systems. The WHO estimated burden of disease in Europe for ischemic heart disease is currently about 61.000 disability adjusted life years (DALYS) lost within the European community. Air and noise pollutants have to be controlled for each other in order to obtain objective data of the impact of noise pollution on children's health. Different aspects of SES data do have an impact on vulnerability in regard to environmental pollutants and have to be better understood and included in future action plans. The purpose of this study was to collect and analyse basic data from pre-school children and their potential environmental hazards in Aachen city and suburbs. The study took place from September 2011 to June 2011. This study is part of a prospective multidisciplinary research project of the RWTH Aachen University, Germany at the department of Hygiene and Environmental Medicine, Professor W. Dott and the department of Public Health of Aachen City and suburbs Aachen, Germany.

Abstract

Environmental noise pollution is a constantly growing and annoying factor in everyday life. Negative Health effects, especially due to night time noise, have been well established in adults. Chronic noise pollution can severely affect the cardiovascular and pulmonary system, mental well-being and cognition. Children are particularly vulnerable to chronic noise due to their immature developing physiological system. Chronic noise exposure at young age might severely affect children's health for their entire adult life. Several international studies in regard to children's health and noise exposure have been carried out but more data of young children are needed. At the 5th ministerial conference of the WHO in Parma, Italy in 2010 "children's health in a changing environment", environmental noise pollution was determined as one of the key environmental stressors to tackle in the next decade in regard to children's health. The Parma Policy document suggests the need to obtain more data and set up an action plan until the next high level meeting in 2016.

Methods: Noise studies with sound methodology to investigate cognition in school children have already been carried out (Munich airport study; Tyrol study; RANCH study). In order to obtain data from young children, pre-school children in Aachen City and suburbs have been examined at the pre-school examination. A Survey addressing air and noise pollution was distributed. This study was designed as a part of a "Pathfinder" multidisciplinary research approach in order to get objective information on noise and air pollution and children's health. For logistical reasons only data obtained from the questionnaire and the pre-school examination will be used for purpose of this Master thesis. *Research Questions:* The hypothesis was postulated that children living in a lower socioeconomic (SES) situation have a higher risk to be exposed to environmental noise pollution and to suffer from detrimental health effects than children from a higher SES background. Furthermore, it was postulated that children exposed to chronic noise and night noise be it environmental or recreational might have a higher prevalence of auditory and non-auditory adverse health effects.

Goal: Data from current literature suggest a strong correlation between noise pollution and chronic health effects. Data of this study should help discuss the possibility of chronic

health problems in children due to early chronic noise exposure and their future life. As the effects of noise pollution are still ignored by most of the population, awareness, education and action might be needed even before persistent significant statistical data can be obtained in order to protect the health of future generations.

Keywords: environmental air and noise pollution, Children's health,

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List of Abbreviations

DALYs	disability adjusted life years
SES	socioeconomic status
EBD	environmental burden of disease

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