

Publication

A prospective cohort study on ambient air pollution and respiratory morbidities including childhood asthma in adolescents from the western Cape Province: study protocol

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 4114114

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Year 2017

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Journal BMC public health

Volume 17

Pages / Article-Number 712

There is evidence from existing literature that ambient air pollutant exposure in early childhood likely plays an important role in asthma exacerbation and other respiratory symptoms, with greater effect among asthmatic children. However, there is inconclusive evidence on the role of ambient air pollutant exposures in relation to increasing asthma prevalence as well as asthma induction in children. At the population level, little is known about the potential synergistic effects between pollen allergens and air pollutants since this type of association poses challenges in uncontrolled real life settings. In particular, data from sub-Saharan Africa is scarce and virtually absent among populations residing in informal residential settlements.; A prospective cohort study of 600 school children residing in four informal settlement areas with varying potential ambient air pollutant exposure levels in the Western Cape in South Africa is carried-out. The study has two follow-up periods of at least six-months apart including an embedded panel study in summer and winter. The exposure assessment component models temporal and spatial variability of air quality in the four study areas over the study duration using land-use regression modelling (LUR). Additionally, daily pollen levels (mould spores, tree, grass and weed pollen) in the study areas are recorded. In the panel study asthma symptoms and serial peak flow measurements is recorded three times daily to determine short-term serial airway changes in relation to varying ambient air quality and pollen over 10-days during winter and summer. The health outcome component of the cohort study include; the presence of asthma using a standardised ISAAC questionnaire, spirometry, fractional exhaled nitric-oxide (FeNO) and the presence of atopy (Phadiatop).; This research applies state of the art exposure assessment approaches to characterize the effects of ambient air pollutants on childhood respiratory health, with a specific focus on asthma and markers of airway inflammation (FeNO) in South African informal settlement areas by considering also pollen counts and meteorological factors. The study will generate crucial data on air pollution and asthma in low income settings in sub-Saharan Africa that is lacking in the international literature.

Publisher BioMed Central

ISSN/ISBN 1471-2458

edoc-URL <http://edoc.unibas.ch/58006/>

Full Text on edoc Available;

Digital Object Identifier DOI 10.1186/s12889-017-4726-5

PubMed ID <http://www.ncbi.nlm.nih.gov/pubmed/28915873>

ISI-Number WOS:000410973000003

Document type (ISI) Article