Asthma, respiratory allergy and cough

Incidence of selected pulmonary diseases depending on the exposure to ambient PM_{10}

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Urban areas inhabitants living in vicinities of roads with high traffic density are likely to be more exposed to adverse effects of ambient air pollution. In East-Central Europe there is still relatively little evidence on the relationship between air pollution, respiratory efficiency and the occurrence of obstructive diseases.

3,997 inhabitants living in proximity of 7 selected urban busy roads in Warsaw (Poland) and 988 people living in rural areas with low PM_{10} concentration were investigated in 2008-2012. Pulmonary function tests were completed and incidence of respiratory system diseases, allergies, smoking, sport activities, etc. was examined. Analysis of variance (ANOVA) and Kruskal-Wallis test were used to indicate statistically significant differences in spirometric parameters between the groups. Differences in obstructive diseases incidence were assessed with FS ANOVA.

Statistically significant ($p<0.001$) differences in FEV_1, PEF and MEF_{50} were observed between inhabitants of Warsaw and the control group. The significant association between living close to a busy road and risk of obstruction was found and was particularly high among non-smoking persons (4.1-times higher RR of obstruction occurrence). A 1.7% decrease of FEV_1 among non-smokers was associated with a 10 $\mu g/m^3$ increase of 5-years mean PM_{10} concentration. Statistically significant differences ($p<0.05$) between inhabitants of Warsaw and the control group in the incidence of asthma and COPD (but also hypertension) were found.

The results prove a significant role of PM air pollution in development of diseases causing bronchial stricture. Increased incidence of selected pulmonary diseases was associated with increasing concentration of PM_{10}.