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Micronucleus cytome assay in exfoliated buccal cells of children for the evaluation of early biological effects of air pollution exposure. The MAPEC_LIFE project.

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Introduction

Air pollution is a global problem. In 2013, air pollution and particulate matter were classified as carcinogenic to human by the IARC. Children are a high-risk group in terms of the health effects of air pollution and early exposure during childhood can increase the risk of developing chronic diseases in adulthood.

The MAPEC_LIFE (Monitoring Air Pollution Effects on Children for supporting public health policy) is a project founded by EU Life+ Programme (LIFE12 ENV/IT/000614) which intends to evaluate the associations between air pollution and early biological effects in children and to propose a model for estimating the global risk of early biological effects due to air pollutants and other factors in children. This work aims to investigate micronuclei frequency in child cells in association with air pollutant levels and other factors, as lifestyle.

Methods

The micronucleus test was performed in buccal cells of 6–8-year-old children from 5 Italian towns with different air pollution levels. Data on air quality during the study period were obtained from the Regional Agency for Environmental Protection. Details of children diseases, socio-economic status, exposures to other pollutants and lifestyle were collected using a questionnaire administered to children's parents.

Results

During the winter campaign, 1315 children were recruited and their buccal cells sampled. As about air quality, the levels of main pollutants were, as expected, higher in the North of Italy, with a PM₁₀ mean values of 62 and 40 µg/m³ in Torino and Brescia, respectively, than in the other towns (Pisa, Perugia, Lecce). In contrast, micronucleus frequency in buccal cells of children was higher in Brescia (0.06/100 cells) than in any other towns (from 0.03 to 0.04/100 cells).

Conclusions

The results suggested that, in addition to air pollution exposure, some other factors related to lifestyle or further exposures may influence micronucleus frequency and cellular response to air pollutants.



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