

Early Biological Effects in Schoolchildren Living in an Area of Salento (Italy) with High Incidence of Chronic Respiratory Diseases: The IMP.AIR. Study

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Abstract : In the Province of Lecce (Southeastern Italy) an area with unusual high incidence of chronic respiratory diseases, including lung cancer, was recently identified. The causes of this health emergency are still not entirely clear. In order to determine the risk profile of children living in five municipalities included in this area an epidemiological-molecular study was performed in the years 2014-2016: the IMP.AIR. (Impact of air quality on health of residents in the Municipalities of Sternatia, Galatina, Cutrofiano, Sogliano Cavour and Soleto) study. 122 children aged 6-8 years attending primary school in the study area were enrolled to evaluate the frequency of micronuclei (MNs) in their buccal exfoliated cells. The samples were collected in May 2015 by rubbing the oral mucosa with a soft bristle disposable toothbrush. At the same time, a validated questionnaire was administered to parents to obtain information about health, lifestyle and eating habits of the children. In addition, information on airborne pollutants, routinely detected by the Regional Environmental Agency (ARPA Puglia) in the study area, was acquired. A multivariate analysis was performed to detect any significant association between frequency of MNs (dependent variable) and behavioral factors (independent variables). The presence of MNs was highlighted in the buccal exfoliated cells of about 42% of recruited children with a mean frequency of 0.49 MN/1000 cells, greater than in other areas of Salento. The survey on individual characteristics and lifestyles showed that one in three children was overweight and that most of them had unhealthy eating habits with frequent consumption of foods considered 'risky'. Moreover many parents (40% of fathers and 12% of mothers) were smokers and about 20% of them admitted to smoking in the house where the children lived. Information regarding atmospheric contaminants was poor. Of the few substances routinely detected by the only one monitoring station located in the study area (PM2.5, SO2, NO2, CO, O3) only ozone showed high concentrations exceeding the limits set by the legislation for 67 times in the year 2015. The study showed that the level of early biological effect markers in children was not negligible. This critical condition could be related to some individual factors and lifestyles such as overweight, unhealthy eating habits and exposure to passive smoking. At present, no relationship with airborne pollutants can be established due to the lack of information on many substances. Therefore, it would be advisable to modify incorrect behaviors and to intensify the monitoring of airborne pollutants (e.g. including detection of PM10, heavy metals, aromatic polycyclic hydrocarbons, benzene) given the epidemiology of chronic respiratory diseases registered in this area.

Keywords : chronic respiratory diseases, environmental pollution, lifestyle, micronuclei

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