

Pre and Post-Natal Exposure to Air Pollution is Public Health Problem

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The air pollution is a public health problem. The pregnancy period is critical because mother's exposure to air pollutants could affect the fetal development of humans and animals.

Studies in animals and humans had demonstrated the association between the mother's exposure to air pollutants, neonatal mortality and birth defects [1-4]. Veras et al. [3] demonstrated an increase in transplacental diffusion of substances in female mouse which were exposed to air pollution at ambient level during the pre-pregnancy and pregnancy periods. In 2009 [4], the same researchers showed that females which inhaled PM (particulate matter) at ambient level presented a decrease in the number of cycles, of follicles and embryo implantation as well as lower weight of puppies. Reliene et al. [5] showed an increase in frequency of mutations in DNA (desoxiribonucleic acid) of puppies whose mothers were exposed to PM.

In studies with women, Lacasana et al. [6] revealed an association between the increment of 10 $\mu\text{g}/\text{m}^3$ in concentration of PM_{10} and 22% in the deaths of neonates by respiratory diseases. The maternal exposure to O_3 in the second and to CO in third month of pregnancy caused a loss in weight of babies [7-10]. Moreover, the pregnant women who inhaled NO_2 during gestational period present an increase of 25% premature delivery [11]. The mechanism that was suggested to clarify the association between CO and the low weight of neonates would be the competition between this gas and O_2 for the sites in hemoglobin, which would decrease the transport of O_2 to the tissues and harm the fetal development. In terms of the association between O_3 and the decrease in neonate weight, animal studies suggested that this effect would be modulated by maternal inflammatory process. The prematurity could be explained through oxidation of proteins and lipids by NO_2 and the decrease of antioxidant protection of fetus and mother. Experimental studies demonstrated that inhalation of NO_2 during gestational period induced the oxidation of lipids, which are components of placenta, and increased the lethality in post-implantation period of embryo [12]. Gilboa et al. [13] showed the existence of a positive association between the exposure to CO and the *Falot Tetrolgy* (odds ratio: 2,04); between PM_{10} and atrial septus defects (odds ratio: 2,27) and between SO_2 and ventricular septus defects (odds ratio: 2,16). Ritz et al. [14] found CO and O_3 inhaled during the second month of pregnancy, which is a critical period for heart development, caused congenital cardiac malformation.

Considering the studies which were presented in this editorial, the mechanisms that are involved in injuries caused to air pollution in pre and post-natal periods are not well known. Therefore, there is a necessity to study more and to increase our knowledge about this subject to determine the effects of pollutant inhalation during the gestational period in adult age. Moreover, these kinds of studies are

important to create public health policies to decrease the emission of pollutants in atmosphere.

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