Impact of air pollutants on child health and mortality.

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Abstract

A large number of epidemiological studies have discovered a relationship between exposure to air pollution and a variety of illnesses and deaths in children. Criteria air pollutants are six different types of air pollutants that are regulated due to their potential to impair human health and/or the environment: Some of the pollutants found in the air include ozone (O_3), Particulate Matter (PM), Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), carbon monoxide, and lead.

Keywords: Child health, Mortality, Sudden infant death syndrome.

Introduction

Effects of air pollution on the health of children

Mortality: Ambient air pollution has been linked to increased mortality in both children and adults. Air pollution has been connected to Sudden Infant Death Syndrome (SIDS), a leading cause of postnatal mortality [1]. In a comprehensive review of the literature on the link between ambient air pollution and newborn mortality, researchers discovered a consistent and significant relationship between PM and post neonatal mortality due to respiratory causes, as well as sudden infant death syndrome.

Complications in pregnancy: Premature birth, low birth weight, intrauterine growth retardation, abnormal birth length, abnormal head circumference, and tiny size for gestational age have all been linked to elevated levels of harmful air pollution. However, no particular trimester of pregnancy has been identified as the most vulnerable period for the foetus in terms of air pollution exposure [2].

Poor respiratory health: Ambient levels of criteria air pollutants have been associated to a variety of acute and chronic respiratory health impacts in both asthmatic and non-asthmatic children, with asthmatic children being more susceptible to the unfavourable health effects of ambient air pollution. Several studies have linked ambient air pollution to an increased prevalence of asthma symptoms, as well as an increased incidence and prevalence of childhood asthma, particularly among children who participate in sports on a regular basis and take more asthma medication, as well as an increased number of asthma emergency department visits and hospitalizations.

Current levels of ambient air pollution have been linked to growth limitations in children's lung function. An increase in non-asthmatic children reporting respiratory symptoms, as well as an increase in respiratory hospital admissions and emergency department visits, has been linked to ambient air pollution. Exposure to ambient levels of criterion air pollutants has been shown to impair children's immune systems [3].

Risk of rickets due to vitamin D deficiency

Children in the tropics who live in places with higher levels of ambient air pollution have a higher chance of developing vitamin D deficient rickets than those who live in less polluted areas, according to research. The amount of ultraviolet B solar radiation reaching the ground has been found to be inversely related to levels of ambient air pollution (haze). The sun's ultraviolet B energy is required for the conversion of 7-dehydrocholesterol to cholecalciferol (vitamin D3) [4].

Effects on neurological development

The relevance of cognitive function, as well as the increased prevalence of neurodevelopment disorders such developmental delay, Attention Deficit Hyperactivity Disorder (ADHD), and Autism Spectrum Disorders (ASD), has generated a flurry of research on early life exposure to ambient air pollution. Prenatal $PM_{2.5}$ exposure has been studied in terms of structural alterations, cognitive function, and the risk of clinically diagnosed diseases in epidemiological studies. In a study of prenatal $PM_{2.5}$ exposure, children with thin cortex in multiple areas of the brain and impaired inhibitory control were discovered. Impaired inhibitory control has been linked to a variety of mental health disorders, including addictive behaviour and ADHD.

Basic cognitive functions like working memory and the conflict attention network have also been connected to prenatal $PM_{2.5}$ exposure. Individual data is accumulating, indicating that $PM_{2.5}$ exposure alters neurobehavioral function and contributes to cognitive decline. Advancement of air pollution

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policy for the protection of children's health and promotion of healthy brains, equivalent to lead poisoning prevention and reduction of cognitive impairments, is supported on the basis of this developing epidemiological data [5].

Conclusion

According to the numerous epidemiological studies summarised, prenatal exposure to fine PM is clearly associated with numerous adverse effects in children, including acute birth outcomes and chronic respiratory effects, with a growing literature indicating cognitive and metabolic dysfunction. Despite the fact that they are not currently subject to air quality laws, ultrafine particles (UFPs, $PM_{0.1}$) are expected to have a higher toxicity due to their higher surface area/mass ratio, increased oxidative capability, and tendency to translocate into systemic circulation.

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