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Pediatrics & Therapeutics

Commentary

Pediatric Asthma due to NO_2 Emissions in China

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DESCRIPTION

Asthma is a medical condition in which a person's airways become narrow and swell and may cause to produce extra mucus. This condition makes breathing and coughing difficult, shortens breathing, and makes a whistling sound while breathing out. In some cases, it acts as a minor problem, and in some cases, it may serve as a life-threatening chronic respiratory disease. Asthma is the most common chronic disorder among children worldwide. The severity of asthma is linked to polluted air. The primary pollutants in the air are airborne particles, smoke, airborne dust, and found in a haze. These pollutants irritate the airways and cause breathing problems. As per Global Disease Burden (GDB) indexing, air pollution is one of the top five risk factors. This indexing is measured based on Disability-Adjusted Life Years (DALYs). In developed countries, reducing air pollution is on the list of their sustainable development goals. For children, long-term exposure to this high level of air pollution leads to various non-communicable diseases. Nitrogen dioxide (NO_2) is one of the primary pollutants produced from tailpipe exhaust gases on-road and non-road transportation systems. A significant positive association between asthma and NO_2 pollutants is derived from many kinds of research. In recent years most new pediatric asthma cases have been linked to NO_2.

As per the new Air Quality Guidelines (AQG) from the World Health Organization (WHO), the annual average concentration of NO_2 emissions is limited to 10 $\mu g/m^3$. NO_2 is produced from the gas combustion process while cooking and smoking, and it is necessary to maintain distance from children while smoking or better to quit smoking. Public places in China banned smoking to reduce NO_2 emissions from tobacco combustion. In urban areas cooking with gas combustion is switched to electrical cooking to avoid indoor NO_2 pollutants. NO_2 concentration in the outdoor atmosphere may reduce due to deposition or chemical reaction, but indoor NO_2 concentration will only affect humans mainly because it is harmful to pediatric age groups. This rate of NO_2 engagement depends on building ventilation, respiratory rate, the air exchange rate between outdoor and indoor environments, duration of outdoor activities, and indoor surface removal due to chemical reaction or deposition. In urban China, the emissions of NO_2 in outdoor are increased because people migrated from rural to urban. Every year new pediatric asthma cases are raised; in 2019, 637 thousand new pediatric asthma cases were reported in China. In China, every 360 children out of 10,000 children have asthma. The primary source of indoor NO_2 emission is cooking with gas combustion.

The Global Initiative for Asthma (GINA) 2021 report says that if the children aged between 6 to 11 years are with symptoms occurring less than twice per month are recommended to take inhaled corticosteroids whenever given short-acting β2-agonists as rescue therapy. This can help prevent severe exacerbations by enhancing the expression of β2-adrenergic receptors in the airways. If the symptoms occur twice per month is recommended to inhale corticosteroids as maintenance therapy. Preschool students with severe episodic wheezing are recommended to intermittent inhaled corticosteroids with budesonide–formoterol. It is better to use electricity for cooking instead of gas to reduce NO_2 emissions. To save future generations from long-lasting chronic disorders, need to take action against air pollution.

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Received: 04-Apr-2022; Manuscript No. PTCR-22-17593; **Editor assigned:** 06-Apr-2022; PreQC. No. PTCR-22-17593 (PQ); **Reviewed:** 21-Apr-2022; QC. No. PTCR-22-17593; **Revised:** 27-Apr-2022; Manuscript No. PTCR-22-17593 (R); **Published:** 05-May-2022, DOI: 10.35841/2161-0665.22.12.448

Citation: Yao TC (2022) Pediatric Asthma due to NO_2 Emissions in China. Pediatr Ther. 12: 448.