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Short Communication

Air Pollution and Depression: A Comprehensive Review and Meta-Analysis

Daniel Duffy*

Department of Geography and Geo information Science, George Mason University, USA

INTRODUCTION

According to a global burden of disease study and meta-analysis assessing the consequences of interior and outdoor ambient pollution, air pollution likely contributed to about 6 million preterm births and approximately 3 million underweight babies in 2019. According to the authors, this is the first study to look at how air pollution affects many critical pregnancy markers, including gestational age at birth, birth weight reduction, low birth weight, and preterm birth. This is also the first global burden of illness study to include the impacts of indoor air pollution, which accounted for two-thirds of the effects measured, with cooking stoves accounting for the majority of them. There is a wealth of evidence that air pollution is now a major risk factor for the burden of global disease. However, its impacts on perinatal outcomes have so far not been included in these assessments [1].

The Global Burden of Diseases, Injuries, and Risk Factors Study compiled a comprehensive analysis of fatalities, premature mortality, and disability caused by metabolic, environmental, occupational, and behavioural risk factors. This was updated two years later, and the Worldwide Burden of Disease Study attributed short gestation to 29 % of global under-5 mortality and low birth weight to 34 %.

This new version is a complicated study based on a meta-regression analysis of over 150 studies on risk exposure associated to birth weight and preterm birth. Total PM2.5 was found to be responsible for 16 percent of all low birth weight babies and 36 percent of all preterm babies worldwide.

According to the authors, the WHO estimates that more than 90% of the world's population breathes filthy outdoor air, and half of the population is also exposed to indoor air pollution from coal and wood combustion within the home. The study found that reducing air pollution in Southeast Asia and Sub-Saharan Africa, where indoor pollution is ubiquitous and preterm birth rates are among the highest in the world, could cut the global incidence of preterm birth and low birthweight by over 78 percent [2].

Of course, such intricacies are difficult to appreciate from a global viewpoint, especially for those working in reproduction clinics and laboratories. However, several studies have since been published that suggest a direct link between particulate matter air pollution and a variety of reproductive indicators and/or ART outcomes. A recent study indicated that higher PM10 exposure was linked to fewer clinical and continuing pregnancies, while lower PM10 exposure was linked to a considerable rise in pregnancy rates. Air pollution and AMH levels in women, as well as sperm quantity and quality in men; have been linked in other research [3].

Focus on Reproduction published findings from a Chinese research of over 10,000 couples exposed to various levels of air pollution earlier this year, concluding that for every 10 microgram increase in fine particulate matter exposure, the probability of infertility increased by 20%. The authors of the study called ambient air pollution "an unmistakably risk factor for infertility" and suggested that PM2.5 exposure "may enhance follicular atresia through effects on ovarian inflammation.

Tissue damage may result directly from pollutant toxicity, according to a paper published in 2019 by the Forum of International Respiratory Societies' Environmental Committee, "Because tiny and ultrafine particles might get access to organs." This was confirmed in a research published the following year, which discovered black carbon particles in human placentas as part of combustion-derived particulate matter. 'The data show that ambient particles could be carried towards the foetus and constitutes a potential mechanism explaining the harmful health impacts of pollution from early life onwards,' the study authors wrote [4].

Several studies have now established that both particulate matter and chemical pollution from volatile organic compounds have a negative impact on IVF outcomes, with lower levels being linked to better results. Many IVF labs have already implemented detection, monitoring, and filtering systems to ensure 'cleanroom' air quality.

In the formulation of air quality policy, quantitative health effect evaluation has become increasingly significant. It is critical to have precise information on the concentration-response connections for the impacts being studied, such as the relationship between changes in daily air pollution and their influence on health, for such an analysis. As a result, a quantitative meta-analysis of peer-reviewed research was carried out to establish summary estimates

***Correspondence to:** Daniel Duffy, Department of Geography and Geo information Science, George Mason University, USA, E-mail: danielduffy@gmail.com

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for key health impacts connected to PM and ozone exposure. This research was carried out as part of the WHO "Systematic Review of Health Aspects of Air Pollution in Europe" programme [5].

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