“Does Air Pollution Play a Role in Infertility?: a Systematic Review” (2017), by Julie Carré, Nicolas Gatimel, Jessika Moreau, Jean Parinaud and Roger Léandri

By: Bains, Ajeet Keywords: Fertility Pollutants

In 2017, Julie Carré, Nicolas Gatimel, Jessika Moreau, Jean Parinaud, and Roger Léandri published “Does Air Pollution Play a Role in Infertility?: a Systematic Review,” hereafter “Does Air Pollution Play a Role,” in the journal Environmental Health. The authors completed a systematic literature review to investigate the effects of air pollutants on fertility in exposed populations. Since air quality has an impact on overall health as well as on reproductive function, the authors sought to increase the awareness of the importance of environmental protection issues among the general public and the authorities. The article “Does Air Pollution Play a Role” provided the foundation for further research on how air pollution can contribute to low reproductive capacity in areas with high exposure.

Air pollution has a serious toxicological impact on human health and the environment. Pollution can come from small units such as cigarettes to large volumes of emission such as from the motor engines of automobiles or industrial activities. Air pollution causes adverse health outcomes such as respiratory infections, inflammation, and cardiovascular dysfunction. It can also harm or disrupt a variety of bodily functions which are connected to reproductive ability. For example, air pollutants can act as endocrine disruptors, meaning they interfere with hormones that are crucial to reproductive function. Throughout "Does Air Pollution Play a Role," the authors use the terms "fertility" and "infertility" to refer to the ability or inability to produce offspring.

At the time of publication, Carré, Gatimel, Moureau, Parinaud, and Léandri were all doctors in reproductive medicine at the Centre Hospitalier Universitaire de Toulouse, or Toulouse University Hospital, in Toulouse, France. All but Carré were also associated with a research group on human fertility at Paul Sabatier University, also located in Toulouse. They wrote the article to investigate the impact of air pollution on reproductive function. The authors note that there are many studies documenting the effect of pollutants on the human body in ways that could affect procreation, but at the time of publication, the actual effect on fertility was not well known.

The authors conducted a systematic review of the research involving exposure to environmental air pollutants and its effect on fertility. The authors selected relevant studies from January 2000 to February 2016 and used them to compile data involving air quality and infertility. Carré and colleagues grouped the data according to the type of pollutants, such as automobile exhaust pollutants, sulfur oxide, or nitrogen oxide, to draw specific conclusions about their impact on fertility and the molecular pathways involved.

The article consists of four sections. In the first section, Introduction, the authors reference other articles which demonstrate the negative effects of air pollutants on different aspects of the human body, including those relevant to reproduction. In the second section, Methods, they discuss how they found articles and chose which to include or exclude in their study. The third section, Results, consists of many smaller sections, discussing the effects of air pollutants on spontaneous and in vitro fertilization, male gametes in humans and animals, female gametes in humans and animals, and the mechanisms of how air pollutants can affect reproduction. Spontaneous fertility refers to conception which happens without external aid, whereas IVF is a method in which medical practitioners combine an egg and sperm outside the body, and then implant the fertilized egg in someone’s uterus. Gametes are eggs or sperm, which combine to form a zygote that can develop into a fetus. In the fourth section, Conclusion, the authors state that the effect of air pollutants on reproduction is well-established but scientists and physicians still do not completely understand what causes it.

In the first section, Introduction, Carré and colleagues establish that air pollutants have repeatedly been shown to have a negative impact on human health. They list specific pollutants and discuss the health problems, such as cardiovascular disease and respiratory diseases like asthma, those pollutants can cause. They also discuss the mechanisms that may connect the pollutants to the observed health problems, such as oxidative stress, an imbalance of oxygen-containing molecules in the body. Oxidative stress can alter DNA, the material that makes up genes. DNA modification can affect the whole body, and particularly affect procreation by disrupting the production of hormones or degrading the DNA in gametes, which can prevent successful fertilization.


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