

Environmental Epidemiology: Assessing the Impact of Environmental Exposures on Health

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Introduction

The Global Burden of Disease (GBD) estimates for 2010 revealed a troubling trend of increasing years lived with disability due to chronic Noncommunicable Diseases (NCDs). While established risk factors such as smoking, diet, alcohol, drug abuse, and physical inactivity were examined, scant attention was paid to a growing body of evidence suggesting that environmental chemicals, psychosocial stress, and malnutrition during fetal development and throughout life play a significant role in elevating NCD risk. In response to this knowledge gap, we conducted a narrative review, shedding light on the myriad early-life environmental factors contributing to disease etiology. We uncovered a multitude of etiologic associations and argue for a more comprehensive approach in future GBD estimates, encompassing the impact of environmental exposures on recognized risk factors for NCDs. By broadening the definition of environmental disease and enhancing methodologies for assessing early-life exposures and their lifelong health consequences, we can gain a deeper understanding of causal links and foster the motivation needed to develop strategies for mitigating avoidable exposures and reducing disease risk.

Description

Ambient noise is commonly associated with hearing impairment, it can also have non-auditory health effects. Chronic exposure to high levels of noise has been linked to various health problems, including increased stress levels, sleep disturbances, cardiovascular issues (such as hypertension), and cognitive impairment. Prolonged exposure to noise pollution can contribute to these health conditions, but they may not always be immediately evident. Noise pollution can trigger the body's stress response, leading to the release of stress hormones like cortisol. Over time, chronic stress can have detrimental effects on overall health, including a weakened immune system, which can increase susceptibility to various diseases. Persistent noise during sleep can disrupt sleep patterns and lead to poor sleep quality. Inadequate sleep is associated with a range of health problems, including impaired cognitive function, mood disorders, and an increased risk of chronic diseases such as obesity and diabetes. Long-term exposure to noise, especially at night, has been linked to an increased risk of cardiovascular diseases like hypertension and heart disease. Noise-induced stress responses and sleep disturbances can contribute to these health issues [1].

One significant challenge is that the evidence regarding the causal links between exposure to various environmental factors and health outcomes is continually evolving. This means that our understanding of how environmental exposures contribute to diseases may change over time as new research becomes available. Another obstacle is the lack of reliable exposure data at the population level, especially when it comes to exposures that occurred in early life. Collecting data on past exposures, especially from years or decades ago, can

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be difficult and may rely on retrospective assessments, which may not always be accurate. Despite these challenges, expert panels and organizations like the World Health Organization (WHO) have attempted to estimate the disease burden attributable to environmental exposures. The WHO estimated that a substantial proportion of the global disease burden and deaths could be linked to environmental factors, with a particularly high impact on children's health. The WHO defines the "environment" in a comprehensive way, encompassing a wide range of physical, chemical, and biological factors external to the human host. This definition acknowledges that the environment not only directly affects health but also influences unhealthy behaviors [2-4].

Despite these efforts, it is acknowledged that even these estimates likely underestimate the true extent of the contribution of environmental factors to disease burden. Factors such as early-life chemical exposures and the impact of ambient noise on other risk factors are mentioned as examples of areas that may not have been fully accounted for in previous assessments. Quantifying the disease burden caused by environmental factors is a complex task due to evolving evidence, data limitations, and the multifaceted nature of environmental influences on health. Efforts to improve our understanding of these relationships and refine disease burden estimates continue to be a priority for public health research and policy development. PCBs are a group of organic chemicals that were once widely used in various industrial applications, including electrical equipment and insulation. They are known for their persistence in the environment and the human body.

Despite being banned in the United States since the 1970s due to their harmful effects, PCBs continue to be detected in people's bodies, mainly through exposure to contaminated foods and environmental sources. BPA is a synthetic compound commonly used in the production of plastics and epoxy resins. It has been recognized as an endocrine disruptor, meaning it can interfere with hormonal systems in the body. BPA is found in various consumer products, including food and beverage containers, and can leach into the contents, potentially leading to human exposure. Phthalates are a group of chemicals used as plasticizers to increase the flexibility and durability of plastics. They are often found in products such as vinyl flooring, medical devices, and personal care products (e.g., cosmetics and fragrances). Some phthalates have been associated with endocrine disruption and other health concerns, and exposure can occur through ingestion, inhalation, or dermal contact. Apart from BPA, there are several other bisphenols, such as BPS (bisphenol S) and BPF (bisphenol F), which have been used as BPA alternatives in certain products. However, emerging research suggests that these compounds may also have similar endocrine-disrupting properties [5].

Conclusion

Ambient noise is not just an inconvenience; it can have significant health implications that go beyond hearing impairment. However, as the passage pointed out, many disease burden assessments often do not adequately consider these non-auditory health effects of environmental noise, highlighting the need for a more comprehensive approach to evaluating the impact of environmental factors on human health.

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Conflict of Interest

The Author declares there is no conflict of interest associated with this manuscript.

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