Mini Review
Volume 11:5, 2021

Journal of
Pulmonary & Respiratory Medicine

ISSN: 2161-105X

Open Access

The Effect of Climate Change on Respiratory Diseases

Cassidy Connolly, Rachel Day* and Hayley Goodall

Conestoga College Institute of Technology and Advanced Learning, Kitchener, Ontario, Canada

Abstract

Climate change and the associated decrease in air quality have led to profound effects on the widespread presence of respiratory diseases and allergens. Urbanized lifestyles and growing transportation emissions have shown to have a negative impact on the environment. Predominantly, increased average temperatures, CO_2 and NO emissions, allergen and mold production, harsh weather conditions and Volatile Organic Compound (VOC) release from vegetation. Based on a review of past literature; the present study provides an overview of the link between the prevalence of respiratory diseases and allergies in response to anthropogenic factors that have induced global climate change. There are an abundance of factors that are contributing to climate change that can be correlated to respiratory diseases and allergies. Respiratory disorders that correspond to climate change include: allergic respiratory disorders, asthma, exacerbations of chronic obstructive lung disease, and decrease in lung function. Increase in vehicle emissions over the years has been shown to have a direct relationship with respiratory allergies. Increase in respiratory allergies has also been linked to people who live in industrialized areas. These results indicate that climate change is affecting the respiratory health of a wide variety of people. There are many disorders, including an increase in allergies and different diseases that correspond to climate change and the factors causing climate change. This information is important and very relevant due to the drastic changes that have happened to our Earth in the past 10 years. In the past 10 years carbon dioxide emissions have increased 10%, sea levels have risen 1.6 inches, and average temperature has increased by 0.22 degrees Celsius.

Keywords: Respiratory health • Climate • Pollution

Introduction

With increased concentrations of greenhouse gases, notably carbon dioxide (CO_2), in the atmosphere, the average global temperature is rising. The relationship between average temperature and the water-cycle means that alterations can impact ecosystems, as well as the prevalence and severity of weather events. Some predict that climate change will impact all aspects of human life, and be our greatest modern challenge [1,2].

Global climate change is in part, if not fully, due to anthropogenic activities that produce air particle pollution, ground-level ozone and vehicle emissions. Fine particle air pollutants, less than 2.5 microns, are able to settle in the lower respiratory tract and damage structures such as the alveoli in the lungs. Ozone is a hazardous pollutant that causes tissue damage in the airway and lungs [3,4].

While the causes of global climate change are negatively impacting human health, the consequences that follow are further exacerbating this effect. Severe weather related events such as heat waves, thunderstorms, droughts, floods and wildfires can all put respiratory health at risk [5]. The variability in temperature and the water-cycle has altered certain plant and fungal reproduction, which consequently alters the aeroallergens they produce. For some plants, the duration of pollen season, in addition to an increase in pollen production.

Overall, these climate fluctuations and resulting events will impact human disease, notably respiratory illnesses. With the growing population, it is important to investigate the impact of air particle pollutants on the developing lungs of children and adolescents in rural and urban environments [6]. Furthermore, as evidence linking climate change and human health grows, pre-existing respiratory disorders can be better managed, ideally leading to fewer exacerbations and medical interventions.

Objective

The objective is to investigate the relationship between the changing climate and the increasing presence of respiratory diseases and allergies. Rising average temperatures caused by urbanization and growing transportation emissions have rapidly increased the existence of harmful air particles. These pollutants can cause allergic respiratory disorders, asthma, exacerbations of chronic obstructive lung diseases, and decrease overall lung function. Researching the effects of changing temperatures on the environment and their impact on respiratory health can provide further information on areas that can be improved in the future. Urbanization and transportation emissions have become an increasingly difficult obstacle to overcome. However, by expanding public knowledge on the harmful impact pollutants have on human health there is a better possibility of improvement in public habits.

Literature Review

The study was done using a systematic review of published journals relevant to the relation between the anthropogenic factors causing climate change and respiratory diseases. Research was done in different cities or geographical areas comparing the statistical prevalence of respiratory disease along with the presence of harmful pollutants in the air and individual effects of each contaminant. The studies included range from prospective to retrospective cohorts either monitoring the development of respiratory disease or the activity of a previously acquired disease based on geographic area [7,8].

Results and Discussion

Due to an increased concentration of ground level ozone, transboundary particulate pollution, altered distribution/concentration of allergens, landscape fires, and vehicle emissions there has been a higher frequency of acute

***Address for Correspondence:** Rachel Day, Conestoga College Institute of Technology and Advanced Learning, Kitchener, Ontario, Canada, Tel: +1519-748-5220 E-mail: Rday9387@conestogac.on.ca*

Received 14 April, 2021; **Accepted** 23 May, 2021; **Published** 30 May, 2021

respiratory events and exacerbations of chronic respiratory diseases. Ozone has been correlated with constant airway and lung parenchyma damage, along with increased asthma exacerbation, hospital admissions and death. Air pollutants can cause a decrease in the development of the lungs in individuals under 18 years old, and lead to an increased risk of respiratory disease in the future. The increasing global temperatures are causing an increase in allergens and allergen strength, and therefore more exacerbations in individuals with extrinsic/allergic asthma. Thunderstorms have shown to provide a higher number of allergens loading in the air, especially in the first portion of the storm.

Conclusion

Climate change has, and will continue to have, significant effects on not only our planet, but the respiratory health of people on our planet. The impact of climate change on our planet that correlates with respiratory disorders and disease include faster plant growth, increase in pollen produced by each plant, increase in allergenic proteins contained in pollen, earlier start time of plant growth, and earlier and longer pollen seasons. Pollen specifically has an increased impact on people who have allergic asthma and seasonal allergies. Climate change is due to an increase in greenhouse gasses, which cause adverse effects in vulnerable populations, including the elderly, immune-depressed, and children/infants. The changes occurring on Earth are causing an increased occurrence of allergic respiratory disease, chronic obstructive lung disease exacerbations, premature mortality, and a decrease in lung function.

References

1. Barnes S. Charles, Neil E. Alexis, Jonathan A. Bernstein, and John R. Cohn, et al. "Climate change and our environment: the effect on respiratory and allergic disease." *J Allergy Clin Immunol Pract* 1 (2013): 137-141.
2. D'amato, G., and L. Cecchi. "Effects of climate change on environmental factors in respiratory allergic diseases." *Clin Exp. Allergy* 38 (2008): 1264-1274.
3. D'amato, Gennaro, Ruby Pawankar, Carolina Vitale, and Maurizia Lanza, et al. "Climate change and air pollution: effects on respiratory allergy." *Allergy Asthma Immunol Res* 8 (2016): 391.
4. D'Amato, Gennaro, Carlos E. Baena-Cagnani, Lorenzo Cecchi, and Isabella Annesi-Maesano, et al. "Climate change, air pollution and extreme events leading to increasing prevalence of allergic respiratory diseases." *Multidiscip Respir Med* 8 (2013): 1-9.
5. Howard, C., and P. Huston. "Climate change and infectious diseases: the solutions: the health effects of climate change: Know the risks and become part of the solutions." *Can Commun Dis Rep* 45 (2019): 114.
6. Kinney, Patrick L. "Climate change, air quality, and human health." *Am J Prev Med* 35 (2008): 459-467.
7. Levin, Kelly. "6 Ways the Climate Changed Over the Past Decade." (2006).
8. Nicolaou, Nicolaos, N. Siddique, and Adnan Custovic. "Allergic disease in urban and rural populations: increasing prevalence with increasing urbanization." *Allergy* 60 (2005): 1357-1360.

How to cite this article: Cassidy Connolly, Rachel Day, and Hayley Goodall. "The Effect of Climate Change on Respiratory Diseases" J Pulm Respir Med 11.5 (2021): 545.