Srivastava, S. (2023). Effects of environmental polycyclic aromatic hydrocarbons exposure and pro-inflammatory activity on type 2 diabetes mellitus in US adults. *Open Journal of Air Pollution*, *11*(2), 29-46. https://doi.org/10.4236/ojap.2022.112003

Definitions

- **Polycyclic Aromatic Hydrocarbons (PAHs):** Chemicals formed during the burning of coal, oil, gas, wood, garbage, and tobacco.

- **Type 2 Diabetes Mellitus (T2DM):** A chronic condition that affects the way the body processes blood sugar.

- **Biomarkers:** Biological indicators, such as specific molecules in the body, that can be measured to assess health conditions.

- **C-Reactive Protein (CRP):** A protein in the blood that indicates inflammation.

- **Hemoglobin A1C (HbA1C):** A measure of average blood sugar levels over the past two to three months.

- **Inflammation:** The body's response to injury or infection, which can also contribute to chronic diseases.

Key Findings

- High exposure to PAHs is linked to increased risk of type 2 diabetes (T2DM).

- Age and BMI are significant risk factors for T2DM in individuals with high PAHs exposure.

- Inflammation, indicated by CRP and monocyte levels, is higher in people with high PAHs exposure.

- There is a sex difference in the association between PAHs exposure and diabetes indicators, with males showing a stronger link with triglycerides and females with CRP.

Introduction

This study investigates the effects of exposure to polycyclic aromatic hydrocarbons (PAHs) on the risk of developing type 2 diabetes mellitus (T2DM) in adults in the United States. It also explores how PAHs interact with other factors like inflammation and alcohol consumption to influence diabetes risk.

Main Content

Background

Polycyclic aromatic hydrocarbons (PAHs) are harmful chemicals found in the environment, especially from burning fossil fuels and tobacco. These chemicals can lead to health problems like lung cancer, heart

disease, and now, potentially, type 2 diabetes (T2DM). This study aims to understand how PAH exposure affects diabetes risk, particularly when combined with inflammation and other risk factors.

Objectives

The main goal is to analyze how PAHs exposure affects the risk of T2DM and to see how this risk is influenced by inflammation, alcohol intake, and other factors.

Methods

- **Participants:** Data from the National Health and Nutrition Examination Survey (NHANES) for 2015-2016 was used.

- **Data Collection:** Researchers measured levels of PAHs metabolites in urine and collected demographic, clinical, and laboratory data.

- **Analysis:** Statistical methods like linear regression were used to study the relationships between PAHs exposure, biomarkers, and diabetes risk.

Results

- **Demographics and Drinking:** Higher PAHs exposure was associated with older age and higher BMI. People in the high exposure group drank more alcohol, with males drinking more than females.

- **Diabetes Indicators:** Higher HbA1C levels were linked to older age and higher BMI in those with high PAHs exposure.

- **Inflammatory Markers:** Higher levels of CRP and monocytes were found in individuals with high PAHs exposure, indicating increased inflammation.

- **Sex Differences:** In men, higher PAHs exposure was associated with higher triglycerides, while in women, it was linked to higher CRP levels.

Conclusion

The study concludes that exposure to high levels of PAHs increases the risk of type 2 diabetes mellitus (T2DM) by promoting inflammation and metabolic changes. Age and BMI are significant risk factors in individuals with high PAHs exposure. The study also highlights sex differences in how PAHs exposure affects diabetes indicators, suggesting the need for targeted interventions. Further research is needed to better understand these associations and to develop strategies to mitigate the risks.

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