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Comorbidities, Behaviors, and Socioeconomic Factors and Mortality from Diseases of the Heart in New Jersey

By Matthew Guariglia, Stephen Poos, Ahmed Gawash, David F. Lo, Aayush Visaria

Abstract

- 186,074 New Jerseyans died from diseases of the heart from 2010 to 2019
- The study aims to establish correlations between health-related risk factors and death from heart disease in each of the six New Jersey counties
- The six counties were ranked by age-adjusted mortality per 100,000 from diseases of the heart
- The data was broken down into three main categories: comorbidities, socioeconomic status, and behavior patterns
- The study correlated 28 health factors including comorbidities, behaviors, and socioeconomic factors to death in adults over 25 from heart disease from 2010 to 2019

Introduction

- Heart disease is the leading cause of mortality in the United States and includes coronary artery disease (CAD), heart attacks, arrhythmias, and heart failure.
- Contributing factors to heart disease include comorbidities such as hypertension, obesity, and diabetes mellitus.
- Lifestyle factors affect health and can contribute to cardiovascular diseases, respiratory disorders, motor-system and muscular problems, and more.
- Social factors related to socioeconomic status, such as education level, occupation, or income, influence diet quality, with low socioeconomic status populations having less access to healthy foods and more access to nutrient-dense foods that are highly processed with fats, starches, and sugar.
- The intersection of socioeconomic status, medical history, and lifestyle plays a large role in mortality of heart disease.

Results

- Strongest linear relationship with heart disease mortality:
    - Hypertension prevalence (R^2 = 0.9957)
    - Atherosclerosis prevalence (R^2 = 0.9266)
    - Food insecurity (R^2 = 0.9823)
    - Overall life expectancy (R^2 = 0.9851)
    - Age-adjusted premature mortality rate (R^2 = 0.9841)
    - Median household income (R^2 = 0.9636)
    - Days spent feeling physically unwell (R^2 = 0.9336)
    - Children living in poverty (R^2 = 0.9188)
    - Population reporting frequent physical distress (R^2 = 0.9043)
- Strong positive correlation (p-values 0.0016 to 0.0625) and statistically significant (alpha = 0.05 level) between mortality and variables such as uninsured, pop:PCP, receiving a free lunch, having a child in the home, violence, poor health, unhealthy days, and distress
- Strong negative correlation and statistically significant (alpha = 0.05 level) between mortality and income ($) and life expectancy, and a strong positive correlation and statistically significant (alpha = 0.05 level) between mortality and early mortality
- Correlation between mortality and % rural is not statistically significant at the alpha = 0.05 level, with a p-value of 0.6952

Discussion

- Strong correlations with mortality from heart disease:
    - Hypertension and atherosclerosis prevalence
    - Physical distress and frequent physical distress
    - Smoking and a poor diet
    - Median income, food insecurity, and lack of healthy food
    - Poverty and food insecurity
    - Child poverty rates and low socioeconomic status
    - Fewer primary care physicians in a county and higher percentages of uninsured people
    - Percentage of the population reporting a sedentary lifestyle
    - Living in an area with higher amounts of violent crime
- Unexpected correlations:
    - Percentage of the population living in a rural area
    - Percentage of the population driving alone to work (no correlation), but percentage of lone drivers reporting a long commute (correlation)
- Importance of primary care physicians in preventing mortality from heart disease
- Need for affordable and effective healthcare in at-risk communities
- Role of public safety in encouraging outdoor exercise
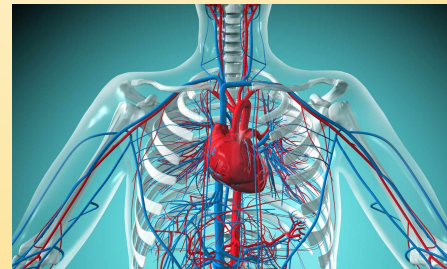
Conclusion

- Three counties had the least mortality rates: Hunterdon, Somerset, and Bergen
- Three counties had the greatest mortality rates: Cape May, Salem, and Cumberland
- The study suggests that mortality from heart disease is caused by multiple interconnected factors, not a single one
- Comorbidity data shows that hypertension and atherosclerosis have the strongest linear relationship with heart disease mortality per county
- Behavior patterns data shows that food insecurity has the strongest correlation with heart disease mortality
- The socioeconomic status category is more complicated, with multiple subcategories showing strong correlations, including overall life expectancy, age-adjusted premature mortality rate, median household income, average reported days spent feeling physically unwell, percentage of children living in poverty, and percentage of the population reporting frequent physical distress

References

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