Log Odds of Diabetes

Genetic risk for T2D will be heightened among individuals living in MJ, Blair SN, Church TS. Physical activity and diabetes prevention. Higher polygenic scores for T2D increased the likelihood of a T2D diagnosis. Although T2D is heritable, the disease is also preventable and treatable with lifestyle management. However, neighborhood features constrain peoples’ ability to engage in healthy lifestyles. Neighborhoods perceived as having high levels of disorder are associated with a greater prevalence of T2D. Few researchers have examined interactions between genetic characteristics and neighborhood features on residents’ health.

Problem / Question
Do perceptions of neighborhood disorder ‘trigger’ genetic risk for Type II Diabetes (T2D)?

Hypothesis

- Genetic risk for T2D will be heightened among individuals living in neighborhoods perceived as having higher levels of disorder.

Project Overview

- T2D is increasing in prevalence and is a major risk factor for cardiovascular disease.
- Although T2D is heritable, the disease is also preventable and treatable with lifestyle management.
- However, neighborhood features constrain peoples’ ability to engage in healthy lifestyles.
- Neighborhoods perceived as having high levels of disorder are associated with a greater prevalence of T2D.
- Few researchers have examined interactions between genetic characteristics and neighborhood features on residents’ health.

Variables / Research

Independent Variables
- Perceptions of neighborhood disorder (environment)
- Type II Diabetes polygenic score (gene)

Dependent Variable
- Self-reported diagnosis with T2D

Covariates
- Self-reported levels of physical activity
- Years of education
- Age
- Gender

Procedure

Step 1: DNA samples collected in 2006/2008 combined
Step 2: Genotyped data used to construct polygenic scores
Step 3: Participants report on neighborhoods and T2D in 2012
Step 4: Weighted logistic regression of T2D on GxE interaction, physical activity, education, age, and gender

We used data from the Health and Retirement Study (HRS).
HRS is a national survey examining economic, physical, mental, and cognitive well-being among United States men and women 50 years and older since 1992.
In the core HRS interviews, respondents report any chronic health conditions they have, including T2D (2010/2014 in the present study).
DNA was collected via Buccal swabs from a random half of households in 2006, and was collected via Oragene kits from the other half in 2008.
HRS staff used combined and genotyped samples to construct standardized T2D polygenic scores.
Participants completed psychosocial questionnaires in 2010/2012 including four items assessing neighborhood disorder (vandalism, vacant houses, trash, and safety).
The analytic sample is 12,090 non-Hispanic white individuals with T2D polygenic scores

Results

- People living in neighborhoods perceived as having higher disorder were more likely to report a diagnosis with T2D.
- Higher polygenic scores for T2D increased the likelihood of a T2D diagnosis.
- Adjusting for levels of physical activity, years of schooling, age, and gender, there was a significant GxE interaction
- Perceptions of neighborhood disorder heighten genetic risk for T2D

Conclusion

- Consistent with the ‘trigger’ GxE typology, perceptions of neighborhood disorder trigger T2D genetic risk.
- Neighborhood effects on T2D may be underestimated in analyses that average over large samples of individuals
- The present results suggest that neighborhood disorder is a modifiable T2D risk factor, and inform community-level interventions

Works Cited


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