

Income Inequality and Cigarette Smoking Behaviors in the United States

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Abstract

Problem/Objective: Greater income inequality has been associated with poorer health in many studies. However, research on income inequality and smoking is very limited. The present study examines how income inequality is associated with cigarette smoking at the state level in the United States.

Methods: We used data from the Behavioral Risk Factor Surveillance System (BRFSS), the Tobacco Use Supplement of the Current Population Survey (TUS-CPS), and the Youth Risk Behavior Surveillance System (YRBSS) to derive state-specific smoking measures for adult and adolescent populations in 1999. The Gini coefficient and Robin Hood Index, two measures of income inequality, were computed from the Census Bureau's household income data for 1999. Cigarette price, the strength of smoke-free air legislation, and median household income were controlled as confounders. Ordinary least squares regression was utilized to examine the relationship between income inequality and several smoking measures.

Results: Among adults, income inequality was inversely associated with ever smoking prevalence, former smoking prevalence, and the quit ratio. No similar conspicuous associations were found between income inequality and smoking behaviors among adolescents, except that ever smoking prevalence displayed a marginal positive association with income inequality. Income inequality was not associated with current smoking prevalence among adults and adolescents.

Conclusion: Our study indicates that ever smokers are less likely to have quit in states with proportionately higher levels of income inequality. The inverse association between income inequality and quitting might serve as a pathway underlying the relationship between income inequality and health.

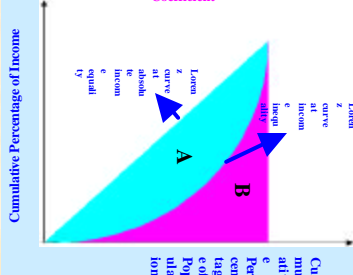
Introduction

- Income inequality is inversely associated with health in many studies
- Potential pathways include:
 - Underinvestment in human and social capital
 - Disruption of the social fabric
 - Psychological effects
- Income inequality is a measure of relative income level in a population
- Relationship between income inequality and risk behaviors, such as cigarette smoking, remains unclear
- Cigarette smoking is a leading cause of many diseases
- Cigarette smoking causes more than four million deaths around the world each year
- Cigarette smoking is influenced by physiological and psychological factors
- Cigarette smoking may play a role in mediating the inverse relationship between income inequality and health.

Methods

- Cross-sectional design to analyze the relationship of income inequality and cigarette smoking
- Data on cigarette smoking were computed from three U.S. population-based surveillance systems conducted in 1999:
 - The Behavioral Risk Factor Surveillance System (BRFSS)
 - The Current Population Survey Tobacco Use Supplement (CPS-TUS)
 - The Youth Risk Behavior Surveillance System (YRBSS)
- Adult measures of smoking behaviors
 - Current smoking prevalence
 - Ever smoking prevalence
 - Former smoking prevalence
 - Quit ratio
- Adolescent measures of smoking behaviors
 - Current smoking prevalence
 - Ever smoking prevalence
 - Ever daily smoking prevalence
 - Abstinence in lifetime smokers
 - Abstinence in lifetime daily smokers
- State household income data in 1999 was obtained from the U.S. Census Bureau
- Measures of income inequality
 - Gini Coefficient
 - Robin Hood Index
- Statistical techniques
 - Ordinary least squares regression
 - Covariates: average price of cigarettes, strength of smoke-free air legislation, and state median household income
 - Stratified by sex for adult analyses

Figure 1. Graphic Illustration of Lorenz Curve and Gini Coefficient



The Lorenz curve represents the cumulative share of the total income accruing at successive income intervals by cumulative percentage of a population. If income intervals are equal, the curve will be a diagonal line at 45°. When the degree of income inequality increases, the curvature of the Lorenz curve will increase accordingly, and the area between the curve and the 45-degree line becomes larger. The Gini coefficient is the ratio of the area between the Lorenz curve and the 45-degree line divided by the whole area below the 45-degree line, i.e., A/(A+B). The value of the Gini coefficient ranges from 0 to 1, with zero denoting absolute equality and 1 absolute inequality.

Figure 2. Gini Coefficient and Robin Hood Index in 50 States and the District of Columbia, the United States, 1999

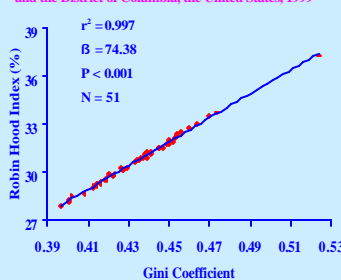


Figure 3. Gini Coefficient and CPS Ever Smoking Prevalence in 50 States and the District of Columbia, the United States, 1999

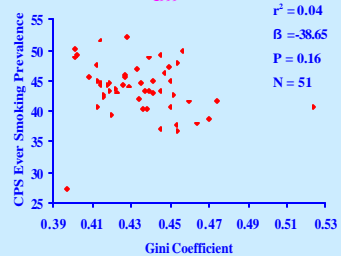


Table: Adjusted Ordinary Linear Regression Analyses of Gini Coefficient and Smoking Measures in the United States, 1999

Adult Smoking Measures	Beta	SE	P value	R ²
Current Smoking Prevalence				
Overall	-14.37	18.16	0.43	0.26
Male	-3.06	21.44	0.89	0.28
Female	-14.48	20.31	0.73	0.20
Ever Smoking Prevalence				
Overall	-67.20	29.12	0.03	0.20
Male	-69.35	29.58	0.02	0.32
Female	-62.27	34.89	0.08	0.16
Former Smoking Prevalence				
Overall	-52.60	18.82	0.008	0.18
Male	-66.16	20.02	0.002	0.22
Female	-37.83	20.95	0.08	0.24
Quit Ratio				
Overall	-45.77	24.00	0.06	0.29
Male	-64.83	27.64	0.02	0.19
Female	-23.51	26.08	0.37	0.37
Adolescent Smoking Measures				
Current Smoking Prevalence	-4.63	65.94	0.95	0.42
Ever Smoking Prevalence	141.58	79.22	0.09	0.51
Ever Daily Smoking Prevalence	-31.43	58.69	0.60	0.27
Abstinence in Lifetime Smokers	4.40	63.74	0.95	0.46
Abstinence in Lifetime Daily Smokers	43.26	32.69	0.18	0.50

Covariates included average price of a pack of cigarettes, smoke-free air index, and median household income.

Figure 4. Gini Coefficient and CPS Current Smoking Prevalence in 50 States and the District of Columbia, the United States, 1999

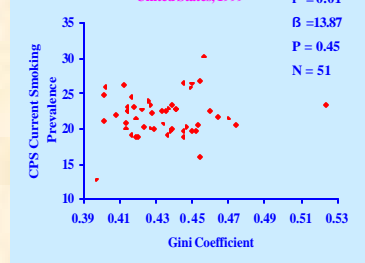


Figure 5. Gini Coefficient and CPS Former Smoking Prevalence in 50 States and the District of Columbia, the United States, 1999

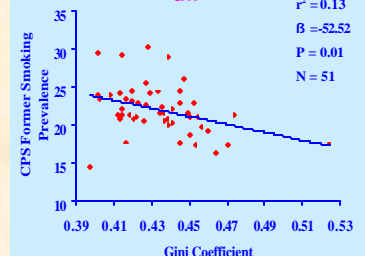
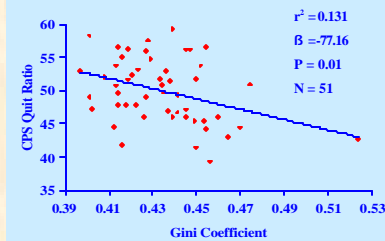


Figure 6. Gini Coefficient and CPS Quit Ratio in 50 States and the District of Columbia, the United States, 1999



Results

- The overall Gini coefficient was 0.45 in the United States
 - Minimum in Utah (0.40)
 - Maximum in Washington D.C. (0.52)
- The national median household income was \$41,994
 - Lowest in West Virginia ((\$29,696))
 - Highest in New Jersey (\$55,146)
- The average price of a pack of cigarettes was lowest in Kentucky (\$2.22) and highest in Alaska (\$3.79)
- SFA index is lowest in North Carolina and highest in Maryland
- Significant inverse associations with income inequality were observed for:
 - Ever smoking prevalence in adults
 - Former smoking prevalence in adults
 - Quit ratio in male adults
- A marginally significant positive association with income inequality was observed for the adolescent ever smoking prevalence
- No significant association was found between income inequality and current cigarette smoking prevalence among adult and adolescent populations
- Results from Gini coefficient were consistent with those from Robin Hood Index

Discussion

- Income inequality reflects relative deprivation of material wealth
- Greater income inequality may produce negative psychological effects among less wealthy populations through the perception of low social status
- Cigarette smoking may become a resort of psychological adjustment among populations with greater income inequality
- Lowered likelihood of quitting in states with greater income inequality may be a result of the negative effects induced by income inequality
- There was no conspicuous relationships between income inequality and smoking behaviors except ever smoking prevalence among adolescents
- Inverse direction in the relationships of income inequality and ever smoking prevalence for adults and adolescents, which is likely due to
 - Smoking pattern is more stable for adults than for adolescents
 - Adolescents may be less influenced by income inequality
 - Different definitions of ever smoking for adults and for adolescents
- Potential limitations
 - Cross-sectional design, with no control over individual-level factors
 - We did not take into account all state level covariates of cigarette smoking, such as mass media campaigns
 - We did not take into account the potential lag time effect of income inequality

Conclusion

- Income inequality is inversely related to measures of quitting in the current study
- Smoking cessation may serve as a mediator between income inequality and health
- Eliminating income inequality may promote smoking cessation and help improve health in a society

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