Racial/Ethnic Disparities in Likelihood of Physical Activity: The Role of Neighborhood Characteristics

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Study Objectives

1) To determine if racial/ethnic disparities exist in adults' likelihood of being physically active (PA) exist

2) To determine those disparities in PA vary across L.A. County census tracts

3) If so, what tract characteristics correlate with that variation, controlling for individuals' characteristics

Methods: Dependent Variables

2 measures of being physically active (PA):

1) Meeting Healthy People 2010 guidelines=
  - vigorous activity (anything that causes the heart to beat faster)
     20 mins/day, 3+ days/wk OR
  - moderate activity 30 min/day 5 days/wk) OR
  - combination of above for the recommended time for 5+ days /week

2) Moderate activity=

   Vigorous or moderate activity for less than # days required for "meeting 2010 guidelines"

Items asked about utilitarian activity, not just "exercise" (walking, yard work, etc)

RAND

Methods: Key Independent Variables

12 types of census tract characteristics:

Built environment factors: Sources:
 1) # households/sq mile   2000 Census
 2) % of land that is park space   2002 Thomas Brothers
 3&4) street connectivity: Tiger software

- gamma - street segment saturation (# street segments/total streets)

- alpha - street circuit saturation (# paths to get around tract/total possible paths)

5 and 6) land use mix   So. CA Assoc. of Govt.s

- % residential, commercial, public, industrial

- land use mix (0-1.0, representing degree of homogeneity of land type - Frank et al.)

Methods: Key Independent Variables

Social factors: Sources:

  7 & 8) crime

    - perceived neighborhood safety   1999/2002 LA Health Surveys

    (somewhat/very safe vs unsafe/somewhat unsafe)

    - # arrests/sq mile 2000-2002   LA City Police Dept.

  9 & 10) ethnic/racial composition   2000 Census

    - % of each category

    - Simpson's racial/ethnic diversity   2000 Census

  11 & 12) income

    - median hh income   2000 Census

    - Massey's index of concentration   2000 Census

$$\text{of extremes} = \frac{\text{\# affluent over 100,000 - \# below FPL}}{\text{total}}$$

Methods: Sample

Random-digit dial survey of representative sample of adults in LA County:

- 2 waves: 1999-2000 (n=8,354) & 2002-2003 (n=8,167)
- 55% and 57% response rates

- Analytic samples:
    16,521 total sample
    <u>- 3,620</u> missing cross streets to identify location
    12,901
    - missing outcome data
            =   6,012 for meeting PA guidelines
            = 12,822 for being moderately PA

Methods: Analysis

Multi-level modeling (using MlwiN software):
- similar to estimating a regression equation for each tract.

- adjusts standard errors to account for the lack of independence among residents of same tract

- Markov Chain Monte Carlo (MCMC)

- included sampling weights and centered variables

- included several characteristics of individuals

Methods: Analysis

Individual-level control variables:

1) General characteristics :

gender, education, age, hours worked, income (FPL), marital status

2) Plus:

- having to use special equipment

- smoking status

- self-reported general health status (fair/poor vs good/excellent)

- having a chronic health condition (asthma, diabetes, heart disease, depr.)

RAND

Results: Modeling Meeting PA Guidelines

Obj.1 - To determine if racial/ethnic disparities exist in adults' likelihood of being physically active (PA):

APIs' OR = 0.5 ** Latinos' OR = 1.2*

Blacks' OR = 0.8

Obj. 2 - Did race/ethnicity' disparities in PA vary across tracts:

APIs' ORs ranged from 0.2 to 1.9 across tracts

Var comp= 4.488 (0.456), p>0.001

Latinos' ORs ranged from 0.5 to 3.0 across tracts

Var comp− 0.938 (0.230), p.0.001

*=p<0.05, **p<0.001

Results: Neighborhood Correlates of Guideline PA

Obj. 3: What neighborhood factors correlated with disparities in PA varying across tracts:

> Household density=   0.014 (0.004)**
>
> Safe neighborhood= -0.461 (0.205)*

How do we know these accounted for the variation in disparities?

> APIs' Var comp= 3.75(1.93), NS   Latinos' Var comp= 1.16(0.81), NS

Which tract characteristics mattered to which race/ethnicity?

> APIs live in areas with lower household density, relative to Whites.
>
> Latinos live in areas with BOTH higher household density and less safe tracts, relative to Whites

*=p<0.05, **p<0.001

Results: Modeling Moderate PA

Obj.1 - To determine if racial/ethnic disparities exist in adults'
likelihood of being physically active (PA):

APIs OR = 0.6**

Latinos OR = 1.2 (p=0.06)   Black's OR = 0.9

Obj. 2 - Did race/ethnicity' disparities in PA vary across tracts:

APIs' ORs ranged from 0.1 to 1.2 across tracts

Var comp= 3.982 (0.412), p>0.001

*=p<0.05, **p<0.001

Results: Neighborhood Correlates for Moderate PA

Obj. 3: What neighborhood factors correlated with disparities in PA varying across tracts:

$\qquad$ % Tract that is park space 1.392 (0.556)*

How do we know these accounted for the variation in disparities?

$\qquad$ APIs' Var comp= 1.112(0.401), reduced, but p<0.05

$\qquad$ APIs live in areas with less park space, relative to Whites.

*=p<0.05, **p<0.001

Limitations

Some tracts had < 5 persons, and many had <30, so we couldn't pinpoint specific tracts for further examination.

We only utilized a measure of park space when data on ALL recreational facilities and their availability (fees and hours) might provide more information.

Indicators of guideline-meeting PA were not comparable in 2000 and 2003. However, we had enough power to detect disparities.

Summary and Implications for Future Research

1) Racial/ethnic disparities in PA were strong in some areas and non-existent in others.

2) Neighborhood characteristics seemed to explain a portion of those disparities. It is important to go into a variety of neighborhoods and collect additional data and/or do qualitative analysis.

3) Racial/ethnic disparities in PA go in the opposite direction from what we normally see.

   Implication: It is important to measure the full range (utilitarian) of PA and not only "exercise"