BIOPSYCHOSOCIAL CONTRIBUTORS TO RACIAL DISPARITIES IN ADVERSE BIRTH OUTCOMES

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OBJECTIVES

1) Discuss stress paradigm and links to adverse health outcomes

2) Describe ethnic differences in lifetime exposure and impact on outcomes in pregnancy

3) Identify physiological mechanisms
African-Americans have the highest infant mortality rate and the highest rates of low birthweight and preterm delivery of all racial and ethnic groups in this country.
• In childhood:
  Cerebral palsy, epilepsy, chronic lung disease, deafness, blindness, ADHD, cognitive deficits, learning disabilities

• In adulthood:
  Cardiovascular disease, diabetes, hypertension
  (Barker thesis)
Intergenerational Perpetuation of Risk

MOTHER
- Birthweight
- Gestational age

INFANT
- Birthweight
- Gestational age
- Fetal Growth
- Gestational age
Disparity not explained by established

Sociodemographic

Behavioral

Medical

risk factors

Psychosocial Stress

Environmental demands that tax or exceed the adaptive capacity of an organism, resulting in physiological and psychological changes that may place the organism at risk for disease.

Cohen, Kessler, & Gordon, 1995
THE EVIDENCE

Stressful life events
Events distress
Perceived stress
State anxiety
Pregnancy anxiety

Birthweight
Gestational length
African-Americans face greater and more severe stressors earlier in life, encounter them more frequently, and perceive these events as more stressful than do other groups.
A Biopsychosocial Model

- Neuroendocrine system
- Immune system
- Cardiovascular system
- STRESS
- Birth outcomes
Neuroendocrine System
THE HPA AXIS

- Placental CRH controls placental clock

- Maternal stress $\rightarrow$ maternal CRH, ACTH, cortisol released

- Triggers additional CRH expression in placenta
Elevated levels of CRH significantly related to…

- **PRETERM LABOR** (Korebritis et al, 1998; Wadhwa et al, 1998)

- **PRETERM DELIVERY** (Hobel et al, 1999; McLean et al, 1995; Wadhwa et al, 2004)

- **FETAL GROWTH RESTRICTION** (Wadhwa et al, 2004)
Immune System
INFECTION

✓ Paternal antigens $\rightarrow$ immunosuppression

✓ Stress $\rightarrow$ immunosuppression

✓ Infection major risk factor for PTD

✓ BV most common; AfrAms highest prevalence

✓ Proinflammatory cytokines promote placental CRH expression
High maternal stress significantly associated with…

• DEPRESSED LYMPHOCYTE ACTIVITY (Herrera et al, 1998)

• BACTERIAL VAGINOSIS (Culhane et al, 2001)

independent of confounders
Cardiovascular System
HYPERTENSIVE DISORDERS

✓ Stress → cardiovascular disorders

✓ Preg-induced hypertension and preeclampsia

✓ Major risk factors for PTD

✓ Significantly elevated CRH levels (Jeske et al, 1990; Perkins et al, 1995; Warren et al, 1995)
• Elevated CRH related to abnormal UTEROPLACENTAL BLOOD FLOW (Giles et al, 1996)

• DBP REACTIVITY to stressor task predicted gestational length and infant birthweight (McCubbin et al, 1996)

• Maternal anxiety associated with PULSATILITY INDEX (Sjostrom et al, 1997; Teixiera et al, 1999)
The health of minority groups is intimately connected to the **HIGH STRESS STATES** created by a social system that condones, reinforces, and perpetuates racial discrimination.

*Myers, 1982*
RACISM LINKED TO

Decreased life satisfaction
Psychological distress  Depression
Lower self-esteem    High blood pressure
Stroke  Cardiovascular disease
INFANT MORTALITY  PRETERM DELIVERY
LOW BIRTHWEIGHT
Few groups, if any, have experienced for so long the kind and degree of discrimination that US-born Blacks have faced.

- Singh & Yu, 1996
... a likely fundamental cause of the nations’s enduring racial/ethnic disparities in health

- James, 2003
ALLOSTATIC LOAD
Physiologic toll of repeated and/or chronic stress system activation

Allostasis

Stress
Recovery
Baseline

Allostatic Load

Baseline

McEwen & Stellar, 1993; Sterling & Eyer, 1988
Physiological Impact of Inequality

- **Weathering** (Geronimus, 1992)
  - as African-American women aged, their risk of delivering a low birthweight infant significantly increased
  - Socioeconomic status moderated the effect
  - Relationship not evident in White women
  - accelerated decline in health status in response to the cumulative effects of social inequality
Physiological Impact of Racism

• AfrAms show heightened & prolonged cardiovascular reactivity to racist stimuli (Armstead et al, 1989; Guyll et al, 2001)

• Hypertension = cardiovascular dysregulation caused by hyperreactivity to stress (Manuck, Kasprowicz, & Muldoon, 1990)

• AfrAms highest rates of general hypertension, hypertensive disorders in pregnancy
Physiological Impact of Racism

- **AfrAms report PTSD-like symptoms** (Thompson, 1996)
  - PTSD associated w/ HPA axis dysregulation
  - Evident in AfrAm adolescent girls and pregnant women
Are there ethnic differences in perceived lifetime exposure to racism events?

Are there ethnic differences in the impact of racism on psychosocial functioning?

Are there ethnic differences in the impact of racism on birth outcomes?
Prospective, repeated measures survey

Psychosocial, medical, physiological variables

480 Ethnically/socioeconomically diverse pregnant women

Recruited in clinics or referred by private MDs

Fluent English

≥ 18 yrs, ≤ 18 wks gestation, non-smokers
SAMPLE consisted of

70  Latinas

177  Nonhispanic Whites

25  Asian/Pacific Islanders

51  African-Americans

with racism data
<table>
<thead>
<tr>
<th>Variable</th>
<th>AfrAm</th>
<th>API</th>
<th>Latina</th>
<th>White</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>2.3(1.7)</td>
<td>3.6(1.8)</td>
<td>2.0(1.4)</td>
<td>4.0(1.6)</td>
<td>0.000</td>
</tr>
<tr>
<td>College</td>
<td>19.6%</td>
<td>60.0%</td>
<td>17.1%</td>
<td>66.1%</td>
<td>0.000</td>
</tr>
<tr>
<td>Work</td>
<td>45.1%</td>
<td>60.0%</td>
<td>70.0%</td>
<td>77.0%</td>
<td>0.000</td>
</tr>
<tr>
<td>Cohab</td>
<td>66.7%</td>
<td>100.0%</td>
<td>88.6%</td>
<td>94.8%</td>
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<tr>
<td>US born</td>
<td>100.0%</td>
<td>48.0%</td>
<td>75.7%</td>
<td>93.1%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
Are there ethnic differences in perceived lifetime exposure to racism?
Have you ever felt that you (or someone close) were discriminated against or the target of prejudice b/c of race in interpersonal, housing, employment, educational, other situations?
## RACISM EXPERIENCES

### LIFETIME

<table>
<thead>
<tr>
<th>Variable</th>
<th>AfrAm</th>
<th>API</th>
<th>Latina</th>
<th>White</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSCR_C</td>
<td>3.2(3.2)</td>
<td>3.1(2.4)</td>
<td>1.4(1.9)</td>
<td>1.0(1.7)</td>
<td>0.000</td>
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<tr>
<td>DSCR_D</td>
<td>72.5%</td>
<td>88.0%</td>
<td>54.3%</td>
<td>40.7%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*Unadj: APIs & AFrAms / Latinas & Whites

*Adj: Latinas / Whites

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
# RACISM EXPERIENCES

## PERSONAL

<table>
<thead>
<tr>
<th>Variable</th>
<th>AfrAm</th>
<th>API</th>
<th>Latina</th>
<th>White</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PERS_C</td>
<td>1.5(1.7)</td>
<td>1.6(1.6)</td>
<td>0.7(0.9)</td>
<td>0.5(0.9)</td>
<td>0.000</td>
</tr>
<tr>
<td>PERS_D</td>
<td>58.7%</td>
<td>72.0%</td>
<td>44.3%</td>
<td>27.4%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*Unadj: APIs & AfAm / Latinas & Whites*

*Adj: Latinas / Whites*

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
RACISM EXPERIENCES

VICARIOUS

<table>
<thead>
<tr>
<th>Variable</th>
<th>AfrAm</th>
<th>API</th>
<th>Latina</th>
<th>White</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VIC_C</td>
<td>1.9(2.0)</td>
<td>1.5(2.0)</td>
<td>0.8(1.3)</td>
<td>0.5(1.1)</td>
<td>0.000</td>
</tr>
<tr>
<td>VIC_D</td>
<td>63.0%</td>
<td>60.0%</td>
<td>37.1%</td>
<td>29.9%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Unadj: APIs & AFrAms / Latinas & Whites  
Adj: Latinas / Whites

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
## RACISM EXPERIENCES

### AS A CHILD

<table>
<thead>
<tr>
<th>Variable</th>
<th>AfrAm</th>
<th>API</th>
<th>Latina</th>
<th>White</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child_C</td>
<td>1.5(1.8)</td>
<td>1.8(1.9)</td>
<td>0.9(1.4)</td>
<td>0.5(1.0)</td>
<td>0.000</td>
</tr>
<tr>
<td>Child_D</td>
<td>51.1%</td>
<td>80.0%</td>
<td>40.0%</td>
<td>25.6%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Unadj: APIs & AfrAms / Latinas & Whites

Adj: AfrAms do not differ from Latinas

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
## RACISM EXPERIENCES

### AS AN ADULT

<table>
<thead>
<tr>
<th>Variable</th>
<th>AfrAm</th>
<th>API</th>
<th>Latina</th>
<th>White</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult_C</td>
<td>2.0(2.2)</td>
<td>1.3(1.8)</td>
<td>0.6(0.9)</td>
<td>0.5(1.0)</td>
<td>0.000</td>
</tr>
<tr>
<td>Adult_D</td>
<td>63.0%</td>
<td>60.0%</td>
<td>37.1%</td>
<td>29.9%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Unadj: APIs & AFrAms / Latinas & Whites

Adj: Latinas / Whites

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
AfrAms and Latinas were significantly less distressed than APIs and Whites.
• AfrAms significantly more likely to keep racism experiences to themselves
• AfrAms significantly more likely to accept unfair treatment as a fact of life
Are there ethnic differences in the impact of racism on psychosocial functioning in pregnancy?
PSYCHOSOCIAL FUNCTIONING

Stressful Life Events

Perceived Stress (PSS)

State Anxiety (STAI)

Pregnancy-related Anxiety

Depression (CES-D)

Personal Resources
ETHNIC DIFFERENCES

Unadjusted

AfrAms & Latinas higher *PSS* than Whites

AfrAms higher *CES-D* than Whites

Latinas marginally higher *Preg Anx* than Whites

Adjusted

Whites lower *Preg Anx* than Latinas and APIs

*Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004*
# Associations with Racism

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r$</th>
<th>$b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSS</td>
<td>0.27**</td>
<td>0.23**</td>
</tr>
<tr>
<td>STAI</td>
<td>0.30**</td>
<td>0.30**</td>
</tr>
<tr>
<td>Preg Anx</td>
<td>0.24**</td>
<td>0.22**</td>
</tr>
<tr>
<td>CES-D</td>
<td>0.18**</td>
<td>0.15*</td>
</tr>
<tr>
<td>Resources</td>
<td>-0.14*</td>
<td>-0.14*</td>
</tr>
</tbody>
</table>

* $p<0.05$, ** $p<0.01$ 

*Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004*
INTERACTIONS

No evidence that racism’s impact on psychosocial functioning was moderated by race.
Are there ethnic differences in the impact of racism on birth outcomes?
## BIRTHWEIGHT DIFFERENCES

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Unadjusted Mean (Adjusted Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>3484.40 (554.63)</td>
</tr>
<tr>
<td>Latina</td>
<td>3447.33 (600.21)</td>
</tr>
<tr>
<td>API</td>
<td>3226.88 (715.70)</td>
</tr>
<tr>
<td>AfrAm</td>
<td>3216.86 (508.72)</td>
</tr>
</tbody>
</table>

*Unadj: Whites / AfrAms*

*Adj: Whites / AfrAms & APIs*

*Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004*
Gestational Age Differences

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>39.15</td>
<td>1.60</td>
</tr>
<tr>
<td>Latina</td>
<td>38.76</td>
<td>2.00</td>
</tr>
<tr>
<td>API</td>
<td>38.14</td>
<td>2.77</td>
</tr>
<tr>
<td>AfrAm</td>
<td>38.60</td>
<td>1.96</td>
</tr>
</tbody>
</table>

Unadj: Whites / APIs (marginal)

Adj: NS

Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004
## Associations with Racism

<table>
<thead>
<tr>
<th>Variable</th>
<th>$r$</th>
<th>$b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW</td>
<td>-0.13*</td>
<td>-0.13*</td>
</tr>
<tr>
<td>GA</td>
<td>-0.12*</td>
<td>-0.12*</td>
</tr>
</tbody>
</table>

*p<0.05

*Parker Dominguez, Dunkel Schetter, Glynn, Hobel, & Sandman, 2004*
INTERACTIONS

No evidence that racism’s impact on birth outcomes was moderated by race.
Conclusions

✓ Ethnic differences in racism exposure, distress, and coping
✓ Racism impacts psychosocial fx and birth outcomes
✓ Physiological mediators important to elucidate
Acknowledgements

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