Assessing the Impact of Stressful Life Events on Small-for-Gestational Age Births: Data from the Indiana Access Project

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Learning objectives

- Describe the theoretical pathways through which stress may negatively impact birth outcomes
- For a sample of urban, low-income, predominantly-minority women,
  - quantify the burden of stressful life events
  - describe the association between stressful life events and small-for-gestational age births
  - evaluate the application of literature-based stressful life event constructs

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Background

- Small-for-gestational age (SGA)
  - Fetus or infant weighing less than expected for gestational age
    - <10th birth weight percentile for specific race/ethnicity and gender
- SGA infants have an increased risk of postnatal complications[1,2,3]
  - Higher mortality rates[4]
  - Neurological dysfunction[1] or impaired neurodevelopment[5]
  - Lower academic achievement[6,7]
  - Possibly type 2 diabetes and hypertension[1]

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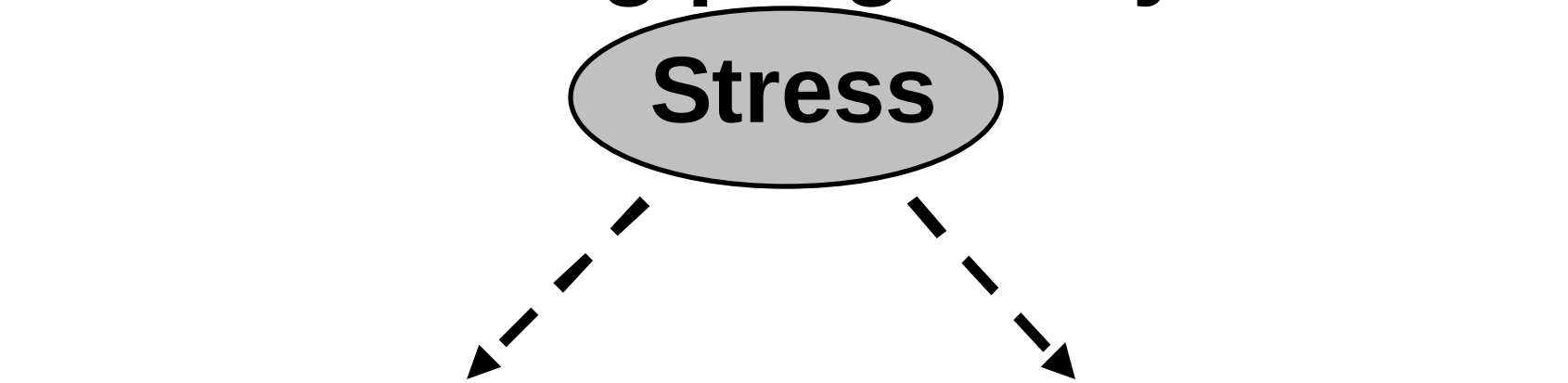
Stress during pregnancy[8-15]



Direct impact

- Hormones
  - Epinephrine, norepinephrine, cortisol
- Immune system
  - Suppression (leading to infection or inflammation)
- Vascular system
  - Hypertension (preterm labor, slowed fetal growth)

Indirect impact

- Negative behaviors
  - Coping mechanisms
  - Smoking, drug or alcohol use
  - Poor hygiene
  - Inadequate nutrition or exercise
  - Decreased utilization of prenatal care
  - Unsafe sexual practices

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Stress during pregnancy, continued

- Previous studies have been inconclusive
  - Lack of association

    -OR-
  - Limitations in study design or modeling

- Primary objective:
  - Examine the relationship between stressful life events (SLE) and SGA births in a sample of urban, low-income women

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Stressful life event (SLE)

- Definition[16]
  - Out of ordinary, demanding event
  - Has the capacity to change patterns of life or lead to unpleasant feelings
- Pregnancy Risk Assessment Monitoring System (PRAMS)
  - Thirteen validated questions
  - Family and social support issues, financial and housing issues, legal issues

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Methods

- Approved by Indiana University IRB

- Indiana Access Project
  - Inclusion criteria
    - Medicaid or socioeconomic equivalence
    - Informed consent/consent to release medical records
  - Exclusion criteria
    - Fetal or infant death
    - Infant placed in neonatal intensive care unit (NICU)

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Methods, continued

- 162 item face-to-face interview with women during post-partum stay (n=525)
  - Assessed occurrence of stressful life event (SLE) utilizing PRAMS questions

- File linked to birth certificate data (n=493)

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Multiple logistic regression (SPSS v13.0)

Birth certificate data:

- Race/ethnicity
- Age
- Substance use during pregnancy
- Medical history/comorbidities
- Pregnancy history, conditions, and related procedures
- Adequacy of prenatal care

Interview data:

- Marital status
- Education
- Receipt of Medicaid
- Pregnancy intendedness

- Three models were examined
- Model 3: SLE constructs *and* total number of SLE

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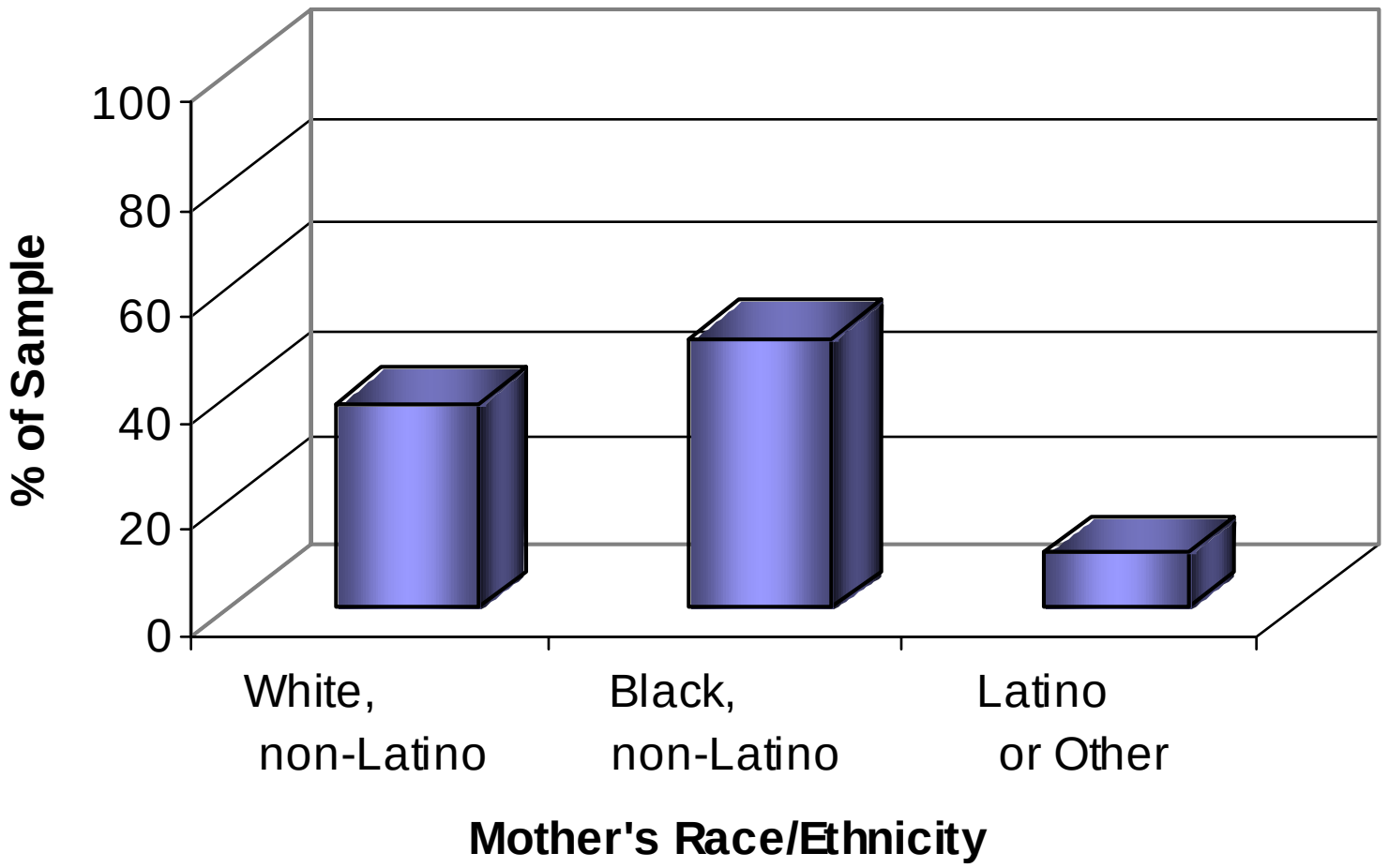
Sample demographics



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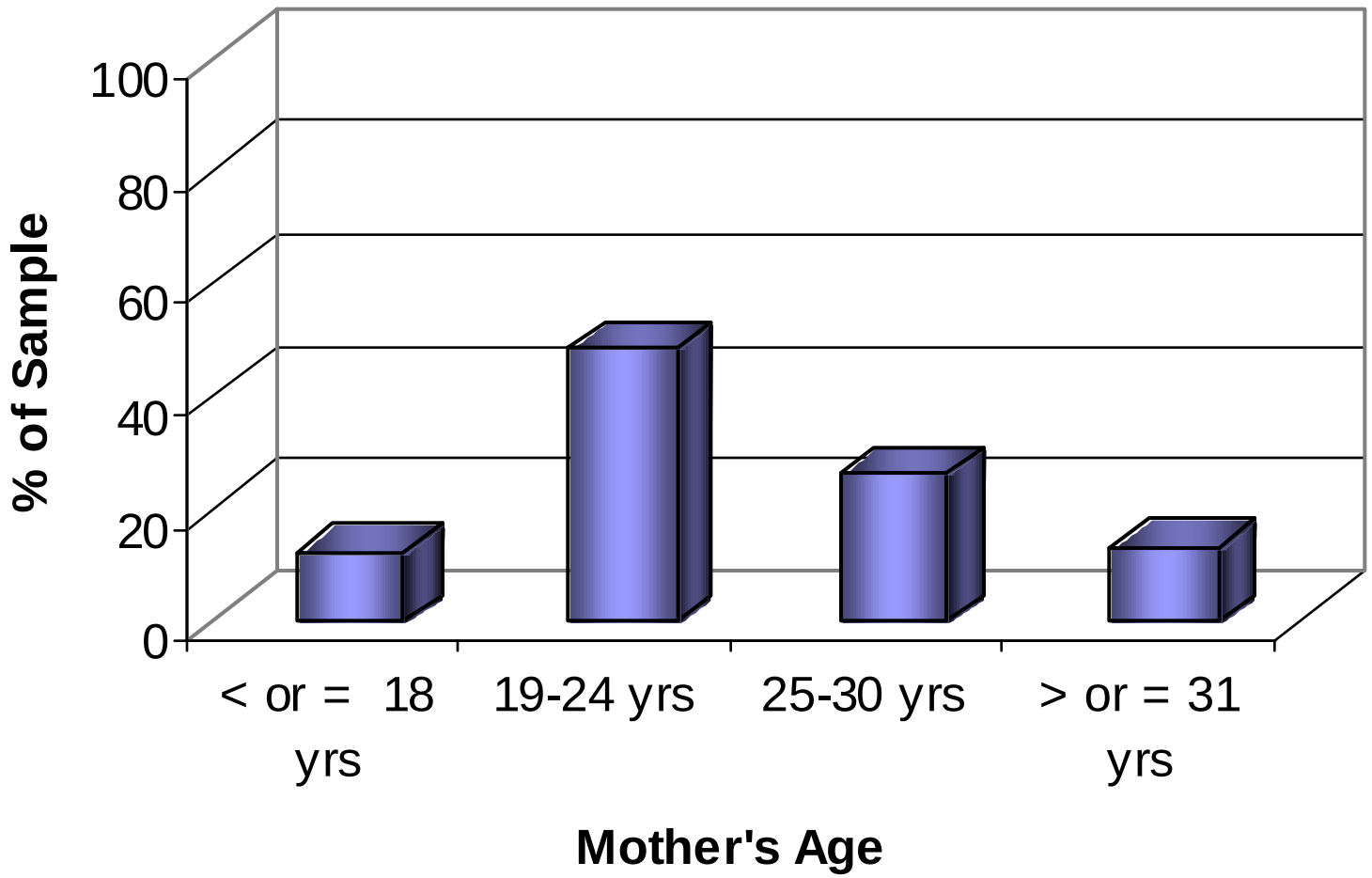
Sample demographics, continued



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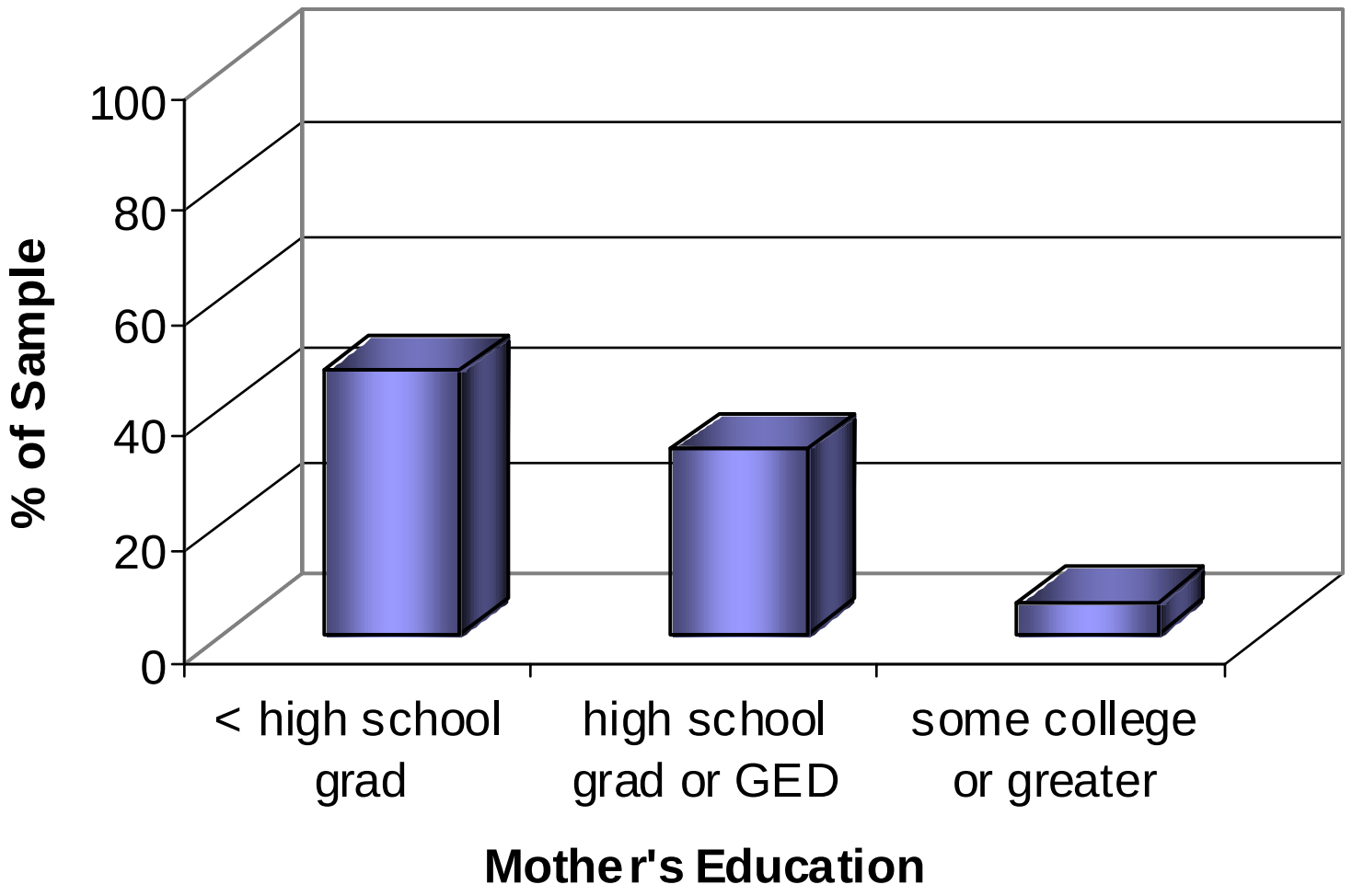
Sample demographics, continued



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Sample demographics, continued

- Marital status:
  - 77.5% not married
- Behaviors during pregnancy:
  - 32.5% smoked
  - 3.7% used drugs
  - 1.4% used alcohol
- 52 (10.5%) SGA infants

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Stressful life event constructs[17,18]

Emotional Death Hospitalization	**Financial** Job loss Bills Moving
Partner-related Separation Argued with partner Partner didn't want pregnancy	**Traumatic** Physical fight Jail Homelessness Friend alcohol/drug problem

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Frequency of SLE reported

Stressful life event	Dataset n=493 n (%)
A close family member was very sick and had to go to the hospital (yes)	144 (29.2%)
Someone very close to you died (yes)	149 (30.2%)
Emotional Stress (yes)	**221 (44.8%)**
You moved to a new address (yes)	254 (51.5%)
Your husband or partner lost his job (yes)	119 (24.1%)
You lost your job even though you wanted to go on working (yes)	123 (24.9%)
You had a lot of bills you couldn't pay (yes)	169 (34.3%)
Financial Stress (yes)	**360 (73.0%)**
You got separated or divorced from your husband or partner (yes)	86 (17.4%)
You and your husband or partner argued more than usual (yes)	158 (32.0%)
Your husband or partner said he did not want you to be pregnant (yes)	62 (12.6%)
Partner Stress (yes)	**220 (44.6%)**
You were homeless (yes)	37 (7.5%)
You were involved in a physical fight (yes)	41 (8.3%)
You or your husband or partner went to jail (yes)	77 (15.6%)
Someone very close to you had a bad problem with drinking or drugs (yes)	104 (21.1%)
Traumatic Stress (yes)	**181 (36.7%)**

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Total number of SLE reported

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Results

Increased odds of delivering SGA infant:

- Age 31 years or older, OR=4.0 (CI=1.3, 12.1)
- Pregnancy-related conditions, OR=8.6 (CI=3.0, 25.2)
- Previous high-risk pregnancy, OR=3.3 (CI=1.2, 9.5)
- Smoking, OR = 2.2 (CI=1.0, 4.7)
- **Total number of stressful life events, OR=1.4 (CI=1.1, 2.0)**

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Results, continued

Decreased odds of delivering SGA infant:

- Educational level greater than high school/GED, OR=0.2 (CI=0.1, 0.9)
- Previous live birth, OR=0.2 (CI=0.1, 0.6)
- **Traumatic stress, OR=0.3 (CI=0.1, 0.7)**

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Discussion

- Experience of an increasing number of stressful life events was associated with an increased odds of delivering a SGA baby
  - Seems to indicate that once the *types* of stressful life events are controlled for, then the total number of stressful life events a woman experiences becomes significantly predictive

- Relationship between select maternal attributes and SGA consistent with literature

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Discussion, continued

- Traumatic stress was associated with a *decreased* odds of delivering a SGA baby
  - Question "You or your husband or partner went to jail" was associated with an *increased* odds of delivering a SGA baby (OR = 4.6, 95% CI = 1.2, 17.7)
  - Affirmative responses to the other questions in the construct had no effect
- Effects of this construct need to be further explored

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Discussion, continued

- Financial stress
  - Although most often reported (72% of sample), financial stress was not statistically associated with SGA
  - Possibly not enough variance in this sample to fully elucidate the potential impact of financial stress

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Limitations

- Representativeness
- No control group
- Selection bias
- Recall bias
- Prevarication bias

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Limitations, continued

- Incomplete information regarding stress and support for women in our sample
  - Timing
  - Additional types of stress
  - Women's perception and response to stress
  - Available support

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Areas for future research

- Utility of these assessment tools in diverse populations
- Assessment of meaning and impact of stress and coping strategies
- Further examination of association between SLE and adverse birth outcomes
- Whether interventions that reduce stress before delivery result in healthier babies

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Conclusion

- Consistent with the literature, select maternal attributes impact the odds of delivering a SGA baby

- As women in our sample experienced an *increasing number of stressful life events*, the odds of delivering a SGA baby *increased*

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