The Experience Of Stressful Life Events In Pregnant Women In Michigan

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Objectives

- Define stressful life events
- Describe the possible methods by which stress can effect pregnancy outcome
- Describe the results of a multivariate analysis that attempted to analyze the relationships between stressful life events and pregnancy outcome
- Discuss how this information may be used in public health intervention

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What is stress?

Stress is a process in which the environmental demands tax or exceed the adaptive capacity of an organism, resulting in physical and psychological changes.[1]

- A certain amount of stress is healthy and necessary for growth and development. [2]
- Stress becomes unhealthy when it becomes acute or chronic.[2]

Numerous articles have documented the effects of stress, particularly stressful life events, on birth outcomes.[3]

- Stressful life events is defined as exposure to out of the ordinary, demanding events, such as job loss, that have the capacity to change patterns of life or arouse unpleasant feelings.[4]

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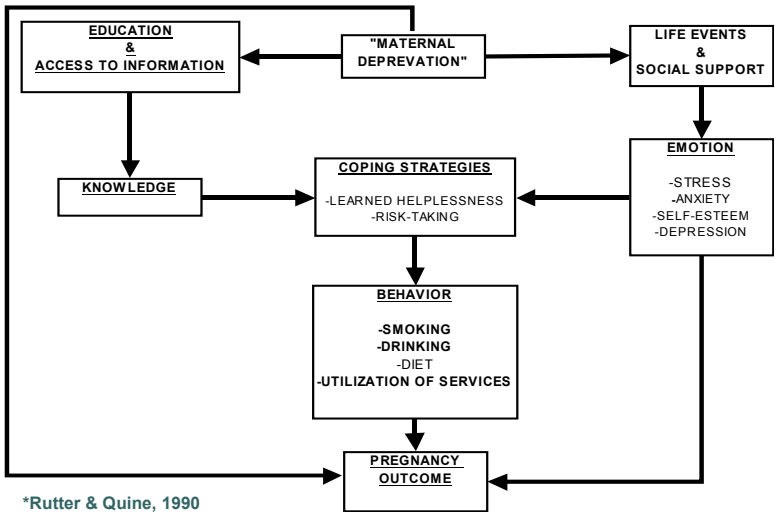
3

The relationship between stress and pregnancy outcomes



*Rutter & Quine, 1990

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4

Methodology

Pregnancy Risk Assessment Monitoring System (PRAMS) is a population-based mail/telephone survey of maternal experiences and behaviors before and during a woman's pregnancy and during early infancy of her child.

- Beginning in July of 2001 in Michigan, the sample population was stratified by birth weight and geographic region
- 1,118 women completed the survey
- The results were weighted to represent all of Michigan's mothers and infants during that time period.

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5

Methodology

Stressful Life Events (SLE) were grouped both by number and type:

SLE by Number

- No SLEs
- 1-2 SLEs
- 3-5 SLEs
- 6-13 SLEs

SLE by Type

- Illness/death SLEs
- Spousal/partner SLEs
- Housing SLEs
- Financial SLEs
- Traumatic SLEs

An initial analysis was conducted looking at the crude association between SLEs and:

- Birth outcome (LBW and pre-term birth)
- Adverse behavior (smoking, drinking, and late entry into PNC)

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6

Methodology

Model Type #1

Multivariate analysis was conducted to observe the association between SLEs and birth outcome when controlling for demographic characteristics.

- Age
- Race
- Education
- Marital Status
- SES

Model Type #2

Multivariate analysis was conducted to observe the association between SLEs and adverse maternal behavior when controlling for demographic characteristics.

- Age
- Race
- Education
- Marital Status
- SES

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NOTE: **Low SES** is defined as living in overcrowded housing (ratio of person/room>1 , receiving public assistance, or being enrolled in either WIC or Medicaid in the prior year.

Methodology

Model Type #3

The association between SLE and pregnancy outcomes was further analyzed by controlling for maternal demographics as well as adverse maternal behaviors:

- Smoking during pregnancy
- Drinking during pregnancy
- Late entry into PNC

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Multivariate Analysis Results for SLEs (by number) Low Birth Weight: Model Type #1

After adjusting for demographic characteristics none of the categories of SLE (by number or type) were found to be associated with low birth weight

		OR (95% CI)
I-2 SLEs		
	Low SES	2.41 (1.46-3.97)
3-5 SLEs		
	Non-Hispanic Black	2.24 (1.25-4.00)

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Multivariate Analysis Results for SLEs (by type) Low Birth Weight: Model Type #1

		OR (95%CI)
Illness/Death SLEs		
	Low SES	1.63 (1.07-2.48)
	Non-Hispanic Black	2.11 (1.40-3.17)
Spouse Partner Problems SLEs		
	Low SES	1.71 (1.11-2.62)
	Non-Hispanic Black	2.10 (1.39-3.15)
Housing SLEs		
	Low SES	1.67 (1.09-2.56)
	Non-Hispanic Black	2.14 (1.42-3.22)
Financial SLEs		
	Low SES	1.72 (1.10-2.69)
	Non-Hispanic Black	2.10 (1.40-3.14)
Traumatic SLEs		
	Low SES	1.68 (1.10-2.58)
	Non-Hispanic Black	2.09 (1.39-3.14)

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Multivariate Analysis Results for SLEs (by number) Pre-term Birth: Model Type #1

After adjusting for demographic characteristics none of the categories of SLE by number were found to be associated with pre-term birth

		OR (95% CI)
I-2 SLEs		
	Low SES	1.98 (1.01-3.92)
6-13 SLEs		
	Non-Hispanic Black	4.87 (1.22-19.40)

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Multivariate Analysis Results for SLEs (by type) Pre-term Birth: Model Type #1

		OR (95%CI)
Illness/Death SLEs		
	Non-Hispanic Black	2.66 (1.53-4.60)
Spouse Partner Problems SLEs		
	Non-Hispanic Black	2.64 (1.52-4.59)
Housing SLEs		
	Housing SLEs	**0.56 (0.34-0.94)**
	Non-Hispanic Black	2.50 (1.44-4.36)
Financial SLEs		
	Non-Hispanic Black	2.65 (1.53-4.60)
Traumatic SLEs		
	Traumatic SLEs	**0.48 (0.28-0.84)**
	Non-Hispanic Black	2.54 (1.44-4.47)

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Multivariate Analysis Results for SLEs (by number) Smoking: Model Type #2

		OR (95% CI)
I-2 SLEs		
	Low SES	3.73 (1.40-9.94)
3-5 SLEs		
	3-5 SLEs	**3.37 (1.39-8.18)**
	20-34 years old	0.30 (0.11-0.86)
	Non-Hispanic Black	0.28 (0.11-0.70)
	<HS	4.13 (1.45-11.75)
	HS/GED	3.40 (1.55-7.46)
6-13 SLEs		
	6-13 SLEs	**3.13 (1.07-9.12)**
	Non-Hispanic Black	0.16 (0.04-0.63)
	Low SES	10.01 (2.26-44.32)
	HS/GED	5.20 (1.28-21.06)

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13

Multivariate Analysis Results for SLEs (by type) Smoking : Model Type #2

		OR (95%CI)
Illness/Death SLEs		
	Non-Hispanic Black	0.24 (0.12-0.50)
	Low SES	3.77 (1.95-7.29)
	<HS	3.32 (1.58-6.98)
	HS/GED	2.00 (1.13-3.51)
Spouse Partner Problems SLEs		
	Spouse/partner SLEs	**1.81 (1.12-2.94)**
	20-34 years old	0.47 (0.23-0.97)
	Non-Hispanic Black	0.25 (0.12-0.51)
	Low SES	3.41 (1.73-6.73)
	<HS	3.46 (1.65-7.25)
	HS/GED	2.09 (1.18-3.71)

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14

Multivariate Analysis Results for SLEs (by type) Smoking : Model Type #2 (cont.)

	OR (95%CI)
Housing SLEs	
Housing SLEs	**1.90 (1.13-3.18)**
20-34 years old	0.45 (0.22-0.93)
Non-Hispanic Black	0.28 (0.14-0.60)
Low SES	3.17 (1.55-6.45)
<HS	3.48 (1.66-7.31)
HS/GED	2.11 (1.18-3.78)
Financial SLEs	
Financial SLEs	**2.26 (1.33-3.83)**
Non-Hispanic Black	0.25 (0.12-0.52)
Low SES	2.77 (1.36-5.65)
<HS	3.44 (1.65-7.15)
HS/GED	2.04 (1.15-3.63)

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Multivariate Analysis Results for SLEs (by type) Smoking : Model Type #2 (cont.)

	OR (95%CI)
Traumatic SLEs	
Traumatic SLEs	**2.41 (1.48-3.94)**
Non-Hispanic Black	0.25 (0.12-0.53)
Low SES	3.41(1.76-6.60)
<HS	3.18 (1.53-6.61)
HS/GED	1.89 (1.07-3.34)

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Multivariate Analysis Results for SLEs (by number) Drinking : Model Type #2

		OR (95% CI)
I-2 SLEs		
	Marital status:Other	0.09 (0.01-0.68)
3-5 SLEs		
	Low SES	0.19 (0.04-0.81)
	<HS	15.94 (2.83-89.93)

After adjusting for demographic characteristics none of the categories of SLE (by type) were found to be associated with drinking

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17

Multivariate Analysis Results for SLEs (by number and type) Entry into PNC : Model Type #2

		OR (95% CI)
I-2 SLEs		
	<HS	3.82 (1.05-13.95)
3-5 SLEs		
	Non- Hispanic Black	2.44 (1.09-5.50)
	<HS	3.23 (1.02-10.20)

		OR (95%CI)
Illness/Death SLEs		
	Non-Hispanic Black	2.20 (1.25-3.86)
	Low SES	1.94 (1.01-3.75)
	<HS	2.38 (1.06-5.32)
	Marital status: Other	1.90 (1.03-3.51)

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18

Multivariate Analysis Results for SLEs (by type) Entry into PNC : Model Type #2 (cont.)

	OR (95%CI)
Spouse Partner Problems SLEs	
Non- Hispanic Black	2.22 (1.27-3.86)
<HS	2.42 (1.08-5.42)
Marital status: Other	1.88 (1.03-3.45)
Housing SLEs	
Non- Hispanic Black	2.24 (1.28-3.93)
<HS	2.41 (1.08-25.38)
Marital status: Other	1.90 (1.03-3.49)
Financial SLEs	
Non- Hispanic Black	2.21 (1.27-3.85)
<HS	2.42 (1.09-5.39)
Marital status: Other	1.87 (1.01-3.46)
Traumatic SLEs	
Non- Hispanic Black	2.20 (1.26-3.84)
<HS	2.41 (1.08-5.40)
Marital status: Other	1.91 (1.03-3.56)

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19

Multivariate Analysis Results for SLEs (by number and type) Low Birth Weight: Model Type #3

	OR (95% CI)
I-2 SLEs	
Low SES	2.56 (1.52-4.30)
No PNC in 1st trimester	2.01 (1.14-3.53)
6-13 SLEs	
Marital status: Other	2.78 (1.02-7.59)

	OR (95% CI)
Illness/Death SLEs	
Low SES	1.68 (1.09-2.60)
Non-Hispanic Black	1.83 (1.17-2.85)
No PNC in 1st trimester	1.59 (1.01-2.48)
Spouse Partner Problems SLEs	
Low SES	1.79 (1.15-2.77)
Non-Hispanic Black	1.82 (1.16-2.85)
No PNC in 1st trimester	1.60 (1.02-2.49)

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20

Multivariate Analysis Results for SLEs (by type) Low Birth Weight: Model Type #3

		OR (95%CI)
Housing SLEs		
	Low SES	1.71 (1.10-2.65)
	Non-Hispanic Black	1.85 (1.18-2.91)
	No PNC in 1st trimester	1.60 (1.02-2.50)
Financial SLEs		
	Low SES	1.79 (1.13-2.84)
	Non-Hispanic Black	1.83 (1.17-2.86
	No PNC in 1st trimester	1.59 (1.02-2.49)
Traumatic SLEs		
	Low SES	1.73 (1.12-2.69)
	Non-Hispanic Black	1.81 (1.16-2.83)
	No PNC in 1st trimester	1.58 (1.01-2.46)

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21

Multivariate Analysis Results for SLEs (by type) Pre-term Birth: Model Type #3

		OR (95%CI)
6-13 SLEs		
	Non-Hispanic Black	3.97 (1.09-14.44)
Illness/Death SLEs		
	Non-Hispanic Black	2.11 (1.16-3.82)
	No PNC in 1st trimester	1.75 (1.03-2.95)
Spouse Partner Problems SLEs		
	Non-Hispanic Black	2.10 (1.16-3.81)
	No PNC in 1st trimester	1.76 (1.04-2.97)
Housing SLEs		
	Housing SLEs	**0.57 (0.34-0.98)**
	Non-Hispanic Black	2.01 (1.10-3.68)
	No PNC in 1st trimester	1.78 (1.05-3.01)
Financial SLEs		
	Non-Hispanic Black	2.11 (1.16-3.82)
	No PNC in 1st trimester	1.77 (1.05-2.97)
Traumatic SLEs		
	Traumatic SLEs	**0.48 (0.27-0.85)**
	Non-Hispanic Black	2.05 (1.13-3.74)
	No PNC in 1st trimester	1.79 (1.06-3.02)

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22

Summary

- This analysis shows that a positive, though not statically significant, association exists between number of SLEs (1-2 and 3-5) and low birth weight when controlling for maternal demographics and behaviors.
- Significant association was found between SLEs (both number and type) and smoking during the third trimester of pregnancy.
- No association found with SLEs preterm births after adjusting for demographic and behavioral factors.

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Conclusion & Recommendations

- SLEs are more strongly associated with birth outcomes via adverse maternal behavior
- SLEs should be further explored to have a better understanding of their impact on pregnancy outcomes
- The literature suggest that racism as a form of stress may explain the disparity in birth outcomes between Whites and Blacks. The 2001 Michigan PRAMS questionnaire has questions about racism that cannot analyzed at this point (resulting from small sample size of those who responded to the questions)

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Limitations

- Recall bias
- Lack of sensitivity for certain analysis
  - Sample size may be too small to detect direct relationship
- Could not differentiate between positive and negative SLEs for some categories
  - i.e. “moving to a new address”
- Grouping of SLEs
  - Number of SLEs does not equate to magnitude
  - Groups may be inter-related
- Could not quantify SLEs

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Questions & Answers

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