Interpregnancy Intervals and Labor Dystocia: Findings from Michigan PRAMS, 2006-07

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Presentation Outline

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- Study Question
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Background: Labor Dystocia

- Originating from the Greek word *tokos*, dystocia literally means “difficult childbirth”[1]
- Labor dystocia is characterized by abnormal labor resulting from abnormalities of the
  - power
  - passenger or
  - Passage[2]
- It is responsible for approximately 40% of all cesarean deliveries in the U.S. and
- Half of repeat cesareans deliveries[3]

Background: Interpregnancy Intervals

- Zhu, et al* examined long intervals, compared to intervals <2 years, in MI from 1994-2002[4]
- Information about labor dystocia was obtained from hospital discharge data in the MI Inpatient Database
- Interpregnancy Intervals were calculated from birth certificate variables
- Prevalence of labor dystocia was ~21% among all births from 1994 -2002
- First births were excluded from analysis
- Long intervals were associated with increasing odds of dystocia compared to intervals <2 years (OR=1.5 for 10+ years)

*Zhu BP, Grigorescu V, Le T, Lin M, Copeland G, Barone M, & Turabelidze G

Background: Interpregnancy Intervals

- In 2005, WHO recommended an interval of at least 24 months between pregnancies, in order to avoid the interpregnancy interval range associated with the highest risk for several negative maternal and infant outcomes.[5]

- The recommendation was a compromise between two schools of thought regarding the available research:
  - Those who believed the evidence supported 18 months as an adequate minimum interval
  - Those who interpreted the evidence as indicating 27 months between pregnancies was safest

Study Question

Could we assess the short (<18 months) and long (≥24 months) interpregnancy intervals' association with labor dystocia in the Pregnancy Risk Assessment Monitoring System (PRAMS) population?

Methods: Exposure/Outcome Variables

- Presence of labor complications was obtained from Michigan birth files and coded as a binary variable

- Interpregnancy intervals were also calculated from birth file information
  - Conception date of index birth = date of index birth – weeks gestation
  - Interpregnancy interval (weeks) = conception date of index birth – date of last live birth
  - Then interval in weeks was converted to months

Methods: Statistical Model

- Multinomial logistic regression was performed using SUDAAN® version 10.0.1
- Short and long intervals were compared to the optimal interval of 18 to <24 months
- Potential confounders considered were
  - Maternal age
  - Race/ethnicity
  - Education
  - Marital status
  - Pre-pregnancy insurance status
  - Parity
  - Trimester of entry into prenatal care
  - Smoking during pregnancy
  - Previous cesarean delivery

Results: Table 1a. Demographics

	Sample Frequency (n)	Weighted Frequency (N)	Weighted Percent	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Labor Dystocia	376	26,604	25.1	22.6	27.8
Maternal Age					
<20	7	271	8.1	3.7	16.9
20-29	168	11,141	21.5	18.2	25.2
30+	201	15,193	29.9	26.1	34.0
Race/Ethnicity					
White	209	18,498	24.6	21.5	28.0
Black	135	5,170	26.7	22.9	30.9
Hispanic	13	1,317	29.1	16.8	45.4
Other	12	1,029	28.9	16.0	46.4
Education					
HS or Less	161	11,646	23.9	20.2	28.0
Some College+	206	14,426	26.0	22.6	29.7

Results: Table 1b. Demographics

	Sample Frequency (n)	Weighted Frequency (N)	Weighted Percent	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Marital Status					
Married	242	18,777	26.0	22.9	29.4
Un-married	134	7,827	23.3	19.3	27.8
Insurance Status					
Private	211	16,115	25.1	21.9	28.6
Medicaid	90	4,593	23.1	18.4	28.6
Uninsured	75	5,896	27.7	21.8	34.5
Parity					
2 Children	195	14,446	24.4	21.1	28.0
3+ Children	181	12,158	26.1	22.3	30.2

Results: Table 1c. Demographics

	Sample Frequency (n)	Weighted Frequency (N)	Weighted Percent	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Trimester of PNC Entry					
1st Trimester	287	20,280	24.2	21.4	27.2
After 1st/No PNC	82	5,901	28.4	22.7	34.8
Smoking during Pregnancy					
No	297	21,146	24.4	21.6	27.3
Yes	74	5,286	29.3	23.0	36.6
Previous Cesarean					
No	316	22,635	27.1	24.2	30.3
Yes	60	3,969	17.6	13.3	22.9

Results: Table 2. Regression Analysis*

Interpregnancy Interval	Odds Ratio	Lower 95% Confidence Limit	Upper 95% Confidence Limit
Short (<18 months)	2.79	1.49	5.23
Optimal (18 to <24 months)	1	Reference	Reference
Long (24+ months)	2.43	1.27	4.65

*After adjustment for age and previous cesarean section

Conclusions

- Interpregnancy intervals outside the optimal range of 18 to <24 months were associated with increased odds of labor dystocia
- These findings support previous work by Zhu, et al, which found an association between long intervals and labor dystocia
- The current analysis adds to previous work by distinguishing the risks of labor dystocia associated with both short and long intervals
- Further research is needed to better understand this relationship and its causes

Public Health Implications

- PRAMS data may be used to estimate the association between interpregnancy intervals and relatively common perinatal outcomes, such as labor dystocia, at a population level
- This approach is more timely and cost effective than more labor intensive methods involving linkages between datasets

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References

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