Maternal and Neonatal Outcomes in Birth Centers: An Integrative Review

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Objectives

- Compare maternal and neonatal outcomes in birth centers and hospital settings.
- State difficulties with aggregation of data from birth center studies.
- Identify the three most common indications for antepartum, intrapartum, postpartum, and neonatal transfers from birth center care.
- Identify maternal and fetal risk factors for complications while receiving birth center care.
- State components of informed consent for birth center care.

Criteria for Inclusion

- Studies of birth center care in facilities in developed countries using clinical guidelines similar to AABC standards
  - Home-like environment
  - Providers licensed in geographic area or certified by national organization
  - Regular assessment of maternal risk status to ensure only low-risk women admitted
  - Fetus assessed to be term, singleton, vertex at admission
  - No regional anesthesia, forceps, or vacuum assist at birth center
  - Synthetic oxytocin used only postpartum
## Maternal and Neonatal Reviews

<table>
<thead>
<tr>
<th>Maternal</th>
<th>Neonatal</th>
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<tbody>
<tr>
<td>&gt;84,300 women</td>
<td>&gt;84,500 women</td>
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<tr>
<td>23 quant, 9 qual publications</td>
<td>17 studies</td>
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<tr>
<td>14 data sets</td>
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<td>8 countries</td>
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## Problems with study of birth center care

- Lack of randomization
- No blinding of the intervention
- Rare outcomes sway samples
- When in care to generate the sample group
  - Sample includes AP transfers? IP transfers? Pre-admit IP transfers? Births only?
Caveats to data aggregation & meta-analysis

- Heterogeneous sample groups
- Differing operational definitions between datasets
- Non-uniform practice guidelines across sites
- Varying provider types and experience levels

Maternal Outcome Summary

[Image of medical procedure] Renee Ya @ Flickr Creative Commons
Criteria for Inclusion in Maternal Review

- Studies of birth center care in facilities in developed countries using clinical guidelines similar to AABC standards
  - Lone exception of one early birth center using forceps
  - Includes:
    - 2 international studies of birth centers in very small hospitals
    - 1 RCT of a separate floor

Mode of Birth

- Higher rates of spontaneous vaginal birth
  - 5 studies reached significance when comparing to low-risk hospital groups
- Lower rates of assisted vaginal birth
  - 6 studies reach significance
- Lower rates of cesarean birth
  - 3 studies reached significance
Length of Labor & Oxytocin

- 3 sources measured length of labor
  - Women had significantly longer labors than in-hospital groups

- 6 studies reported oxytocin use (following transfer)
  - All had a significantly overall lower rate of IP oxytocin use when compared to hospital groups

Pain Management

- Aggregate pharmacologic use
  - 1994 found significantly lower use for birth center group
    - Significantly higher use of sterile water papules

- Narcotics
  - 2 early studies found significantly lower use

- Epidural– 6 studies
  - Significantly lower in all studies
Perineal Integrity

- Significantly lower rates of episiotomy (3 studies)
- Significantly higher rates of intact perineum (3 studies)
- No significant difference in 3rd and 4th degree laceration (2 studies)

Satisfaction

- 2 quantitative studies
  - Women beginning labor at a birth center had significantly higher measures of satisfaction than women who planned hospital births
- 4 qualitative studies
  - Women were satisfied with care
  - Positive relationships with caregivers
- Need for studies of women following transfer
Neonatal Outcome Summary

Criteria for Inclusion

• Studies of birth center care in facilities in developed countries using clinical guidelines similar to AABC standards
• Reporting neonatal outcome data but not focused on a single component of care
• Our manuscript focuses solely on mortality
Apgar Scores

- No differences in Apgar scores between infants born birth centers and hospitals
  - 13 studies
  - infants of primaparas more likely to have low Apgars as compared to multiparas (1 study).

Respiratory Support

- 0 – 5.3% of infants needed respiratory support
  - 9 studies

- Degree of support varies between settings
  - One study reported higher level in BC
  - Two studies reported higher level in hospital

- Parity: infants of primaparous women are twice as likely to need resuscitation (2010)
NICU Admissions

- Most studies reported no difference between infants born in birth centers and hospitals (majority <5% admission rate)
  - 11 studies
- Two studies reported higher admission rates among infants born in hospital
- Infants of primips more likely to be admitted

Seizures

- 3 of 4 studies found increased seizures among infants born in birth centers
  - 0.02% vs 0.04% in US birth certificate data
  - 1 in 1,000 vs 1.5 in 1000 in UK Birthplace Study
- Uncertain clinical significance
- Related to electronic fetal monitoring?
Neonatal Morbidity

- One study reported on morbidity
- Lower rates of fractures and hypoglycemia among infants born in birth center
- No other significant differences in brachial plexus injury, seizures, hypoxia/asphyxia, intracranial hemorrhage, infection, isoimmunization, or hyperbilirubinemia

Neonatal Mortality

- No statistically different rate of neonatal mortality between birth center and hospital groups
  - 17 studies, >84,000 women admitted to a BC in labor
- Primiparas, women >35 years, and EGA >42 wks have higher mortality rates
### AP Transfer

**Overview**
- Range 13-27.2%
- Multiparas 5x more likely to have AP transfer than nulliparas (1 study)

**Commons Reasons**
- Malpresentation
- Hypertension
- Prolonged rupture of membranes
- Post-term pregnancy
- Pre-term pregnancy
- Intrauterine growth restriction
- Gestational diabetes mellitus
- Multiple gestation
- Bleeding
- Iso-immunization
- Fetal anomaly
- Intrauterine fetal demise
- Maternal preference

### IP Transfer

**Overview**
- Pre-admit IP – (2 studies)
- Range 11.6 – 37.4% - denominator changes
- Nullip – 5 x higher than multip

**Commons Reasons**
- Failure to progress\(^p\)
- Meconium\(^p\)
- Fetal distress\(^p\)
- Need for analgesia\(^p\)
- Hypertension\(^p\)
- Malpresentation\(^p\)
- Prolonged rupture of membranes\(^p\)
- Maternal infection
### Postpartum Transfers

**Overview**
- Range 0.5-4.8%

**Common Reasons**
- Hemorrhage
- Retained placenta
- Laceration repair/sphincter damage

### Neonatal Transfers

**6 Studies Reporting**
- Range 2-5%
- National Birth Center Study II: 0.7% of transfers considered urgent

**Common Reasons**
- Respiratory distress
- Hip dislocation
- Fractured clavicle/humerus
- Jaundice
- Hypoglycemia
- Congenital anomaly
Risks for Poor Perinatal Outcomes

MATERNAL
• Nulliparous women
• Advanced maternal age
• Post-term pregnancies

SYSTEM – weak data
• Distance from hospital
• Clear communication and good relationships between providers
• Adequate staffing in receiving hospitals

Informed Consent – Maternal Outcomes

• Women admitted to birth centers in labor have higher rates of vaginal birth and fewer cesareans
  – Nat’l Birth Center Study II: 6% cesarean rate
• Less likely to need pain medication, more intact perineums
• About 12% of women will transfer in labor
  – Primarily first-time mothers
  – Most transfers are not emergencies
### Informed Consent – Infant Outcomes

- Infants born in birth centers have similar Apgar scores as those in hospitals
- 3-5% of babies need to transfer to hospital after birth
  - Most for breathing difficulties
- Infants born in birth centers may have a higher risk of seizures, very rare: One baby out of 2,500

### Informed Consent: Infant Outcomes

- Infant death is very rare
  - For every 2,000 women admitted to a birth center, one will experience an infant death
  - Rate varies within larger literature, but may be slightly higher in birth centers
    - 6 in 10,000 vs. 3 in 10,000 (birth certificate data)
    - Includes birth centers that do not conform to AABC standards
- Infants of first-time and/or older mothers are more likely to have complications (potential summative effect)
AABC Webinar Wednesday:
Maternal & Neonatal Outcomes in Birth Centers: An Integrative Review

Questions?

Join us next month

WEBiNAR
Wednesday

May’s topic – Effective Drills for Your Birth Center