Night-time nurturing: an evolutionary perspective on breastfeeding and sleep

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Anthropological perspective ...

- Phylogenetic depth
  - Traits of mothers & infants common to all mammals
  - Traits of mothers & infants shared with closest primate relatives
  - Traits of mothers & infants unique to our evolutionary history

- Cross cultural breadth
  - Adaptations to more recent ancestral environments
  - Historically novel cultural developments in infant care

- Expose tensions between contemporary infant care practices and evolved maternal & infant biology

Environments of Evolutionary Adaptation

- Common mammalian traits: EEA-1
  - Placental mammals, live-born young, postnatal maternal care & lactation

- Traits shared with closest primates relatives: EEA-2
  - Precocial pattern (hair, sight, hearing), low fat high calorie milk, require close contact

- Traits unique to human evolutionary history: EEA-3
  - Secondarily altricial, poor neuromuscular control, brain development, exterogestate – requires mother to maintain contact 24/7.
Cross-cultural & historical comparison

Medicalisation of childbirth (a)
- Anaesthesia for labour & delivery (Chloroform, Twilight Sleep, Barbiturates)
- Mothers unconscious & incapacitated
- Babies transferred to nurseries for care & feeding
- Aseptic practices reduce mortality
- Hospital births soar...

Medicalisation of childbirth (b)
- Psycho-prophylaxis movement
- Narcotic use reduced
- Separation justified due to infection control
- Babies removed to a ‘safe place’
- Mothers to rest following delivery
- Meet for scheduled feeds only

Environments of Recent Cultural Change: 1
Environments of Recent Cultural Change: 2

Era of ‘Scientific Motherhood’
- Legacy of experts
- Schedules, no affection, no breastfeeding
- Scientifically formulated infant food
- Dramatic decline in breastfeeding

Science of infant sleep
- Tables enumerating infant sleep requirements
- Settling by 3 months = mark of successful parenting
- ‘Strengthening’ formula to promote sleep
- Teach baby to sleep through night
- Good baby = comatose = formula-fed

Impact of Novel Infant Care Practices 1 & 2
- NICP1 (Mother-infant separation)
  - Negative consequences for psychological development & physiological functioning
  - Undermines both breastfeeding & lactation
- NICP2 (Artificial infant feeding)
  - Negative consequences for infant & maternal health
- Breastfeeding promotion, Delivery room SSC
**Counteracting the impacts**

- Delivery room SSC promotes breastfeeding initiation
- Rooming-in on postnatal ward reduces separation
- Sleeping in close contact ameliorates frequent night feeding and later settling
- Sleep contact = mammalian-typical behaviour

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**Mother-infant sleep contact**

- ~50% of all UK infants bed-share by 4 months of age

**Over 3–6 months**

- Tuohy et al (1998) 43% 6,268 NZ families interviewed at clinics
- Rigda et al (2000) 46% 44 Australian families – questionnaires
- Ball (2002) 47% 221 NE UK families interviewed/sleep diaries
- Brenner et al (2003) 48% 394 inner city (DoC) mothers interviewed
- Van Steenwijk et al (2003) 49% 210 Dutch families – questionnaires
- Blair & Ball (2004) 46% 1,095 UK CESDI control families – HV interview
- Lahr et al (2005) 77% 1,987 US families – Oregon PRAMS surveys
- Bolling et al (2007) 49% 12,290 UK mothers – postal survey

**Specifically at night (in 1st month)**

- Blair & Ball (2004) 22% 63 UK CESDI control families – HV interview
- Blair & Ball (2004) 21% 261 NE UK families – sleep diaries

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**Breastfeeding & bed-sharing**

- Strong association between breastfeeding and infant sleep location
  - 70% of UK mothers who breastfeed bed-share
  - Facilitates night-time feeding, and helps mothers breastfeed for longer

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*Non-bed-sharers* *Bed-sharers*

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<thead>
<tr>
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<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
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<tr>
<td>Non-BF</td>
<td>70</td>
<td>60</td>
<td>50</td>
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<td>30</td>
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<td>10</td>
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<td>BF</td>
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27% still BF
49% still BF

bed-sharing at 1 month and breastfeeding to 4+ months (x^2=5.45, df=1, p<0.05)
Bed-sharing encourages frequent suckling

- McKenna et al observed that mothers and 11-15 wk infants breastfed twice as frequently at night when sleeping in contact than when sleeping apart.
- In our community study we found:
  
<table>
<thead>
<tr>
<th>Breastfeed frequency at night (maternal nightly report)</th>
<th>Bed-sharers</th>
<th>Non-bed-sharers</th>
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</thead>
<tbody>
<tr>
<td>1st month</td>
<td>2.31 (n=69)</td>
<td>1.93 (n=59)</td>
</tr>
<tr>
<td>p=0.03</td>
<td>0.89 (n=50)</td>
<td>0.04</td>
</tr>
<tr>
<td>2nd month</td>
<td>1.89 (n=68)</td>
<td>1.16 (n=57)</td>
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<td>p&lt;0.001</td>
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- To explore the effects of sleep contact on both early breastfeed frequency and long-term duration we randomised 64 mothers and infants to 3 different sleep conditions on the post-natal ward: Baby in bed, baby in side-car crib, & baby in bassinette.

Post-natal ward sleep contact

- Two ward-based video studies (randomised infant sleep location) and large RCT with breastfeeding follow-up.
- Close and unhindered contact allows baby to easily attract mother’s attention.
- Encourages greater interaction, resulting in more frequent attempted and successful feeds.
- Increases prolactin production which influences timing & intensity of lactogenesis II.
- More frequent feeds → earlier & more copious milk production at lactogenesis II with potential consequences for breastfeeding duration.

Breastfeeding initiation

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<tr>
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<th>Bed</th>
<th>Crib</th>
<th>Cot</th>
<th>Pair-wise t tests</th>
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<tbody>
<tr>
<td>Successful feeds per hour</td>
<td>1.69</td>
<td>1.80</td>
<td>0.79</td>
<td>Bed vs Crib; ns</td>
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<td>Bed vs Cot; p=0.01</td>
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<td></td>
<td></td>
<td>Crib vs Cot; p=0.01</td>
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<tr>
<td>Feeding attempts per hour</td>
<td>3.01</td>
<td>2.78</td>
<td>1.15</td>
<td>Bed vs Crib; ns</td>
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<td>Bed vs Cot; p=0.01</td>
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<td></td>
<td></td>
<td>Crib vs Cot; p=0.02</td>
</tr>
<tr>
<td>All feeding effort per hour</td>
<td>4.50</td>
<td>4.58</td>
<td>1.94</td>
<td>Bed vs Crib; ns</td>
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<tr>
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<td>Bed vs Cot; p=0.01</td>
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<td>Crib vs Cot; p=0.00</td>
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<tr>
<td>Nipple presentation per hour</td>
<td>5.97</td>
<td>5.31</td>
<td>3.04</td>
<td>Bed vs Crib; ns</td>
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The way breastfeeding dyads sleep together is very distinctive, regardless of bed-space:
- Mother = lateral, curled up around baby, making 'safe space' for baby with body
- Baby = supine, breast height, away from pillows, oriented towards mother

Babies sleeping in close contact with mothers on average 0.1°C warmer overnight than babies sleeping alone – evidence infants might overheat?
- Babies in sleep contact spend greater % of night in REM sleep
- Babies warmer in REM sleep and cooler in NREM, regardless of sleep location
- No difference in temperature when sleep states are compared

Babies experience more airway covering when in sleep contact – evidence for potential suffocation or re-breathing?
- Airways frequently covered an uncovered when bed-sharing
- Movement of bed-partners creates air channels in bedding
- Neither SatO₂ nor HR were affected by airway covering, regardless of duration
- No evidence of compression/overlying
McKenna (1986) hypothesised that infants sleeping in the absence of mother’s body were lacking her physiological regulatory influence. They may leave them more vulnerable to breathing control errors when deprived of sensory stimuli which induce arousals (therefore at risk of SIDS). Mosko & McKenna documented a greater frequency of infant arousals, and more light and less deep sleep for both mothers and infants when in sleep contact than when sleeping alone. This supports the hypothesis that mother’s presence is protective. Many mothers subjectively feel their presence is protective.

### Hazardous sleep contact?

- Some argue parent-infant sleep contact is a questionable practice that should be abandoned.
- Concerns due to risk of SIDS (accidental death).
- Accept little or no value to mother-infant sleep contact.
- Sofa-sharing and sleep contact with parents who smoke, consume alcohol etc. is high risk.
- For breastfeeding non-smoking mothers, the picture is obscured by inconsistent criteria defining bed-sharing and lack of data on feeding type.
- Breastfeeding mothers appear to avoid entrapment hazards etc. due to protective sleep position – which appears to be instinctive.

### Sleep contact without breastfeeding

- Sleep contact with a young infant in the absence of breastfeeding is a NICP.
- Non-breastfeeding mothers did not create the ‘safe space’ exhibited by breastfeeding mothers.
- Sleep of both bed-partners is different – more deep, less mutual orientation.
- No hormonal feedback system to keep in tune.
Environments of Recent Cultural Change Revisited...

- ERCC-3 = changes instigated in delivery and postnatal care by UNICEF BFHI & breastfeeding promotion
  - Acceptance of importance of contact, touch, closeness etc. - implementation leaves room for improvement
  - Target for ERCC-4 = breastfeeding as default option for infant feeding & cultural acceptance of mother-infant sleep contact
- Impossible to duplicate ancestral EEAs in 21st century
- ERCC-4 = emulation of EEAs within current context of post-industrial societies