**Research Overview: Bed-sharing and co-sleeping**

**Bed-sharing and co-sleeping**

*Helen Ball, BSc, MA, PhD, Professor of Anthropology, Durham University*

This review examines the issue of babies sleeping with their parents. Beginning with an anthropological perspective, the biological underpinnings of parent-baby sleep contact are explored, as are cross-cultural practices. The relationship between baby sleeping and feeding practices in the UK is considered alongside with the safety aspects of bed-sharing.

**Key points:**

- Parent-baby sleep contact is a predictable human behaviour based on our species’ evolutionary biology;
- Bed-sharing is a common method of night-time care employed by around half of all UK parents in their baby’s first month of life;
- Bed-sharing and breastfeeding are strongly related and sleeping in close proximity to their baby helps mothers to breastfeed;
- Epidemiological data show that bed-sharing is associated with an increased risk of Sudden Infant Death Syndrome (SIDS) for babies whose parents are smokers, consume alcohol or drugs, or who sleep with their baby on a sofa;
- Research into the benefits and hazards of bed-sharing should consider WHO is bed-sharing; the circumstances under which bed-sharing is taking place (WHERE and HOW), and the way in which bed-sharing is conducted (WHAT);
- There is no simple message about bed-sharing that will fit the needs of all families. Parents should be encouraged to weigh up the risks and benefits that pertain to their individual circumstances and make an informed choice about what is best for them and their baby.

**Introduction**

This review considers babies’ sleep location at night, specifically parent-infant bed-sharing and/or co-sleeping. This is a baby care issue caught between two public health objectives, both aimed at preserving infant health and well-being – one being breastfeeding promotion, the other prevention of accidental death and SIDS [Sudden Infant Death Syndrome]. Advocates on both sides of the discussion have the interests of parents and babies at heart, but the messages are sometimes contradictory, causing confusion and anxiety for parents, health professionals, and parenting support organisations who sometimes feel caught in the cross-fire. Understanding that there is no single simple message that is appropriate for all families and all situations is an important component to understanding this issue and helping families make informed choices.

**Co-sleeping as an evolutionary baby care practice**

When considering the needs of mothers and babies, the vantage point of anthropology provides a novel perspective (in comparison with epidemiology or clinical practice, for instance) in illuminating the tensions regarding infant care. An anthropological examination begins by drawing comparisons in infant care across humans and other mammals. This comparative mammalian perspective helps to define three things: a) those traits of human infants that are common to all mammals; b) those that are shared only with our closest primate relatives; and c) those that are unique to the evolution of our species. The fundamental commonalities shared with other placental mammals involve the production of relatively well-developed live-born young who require postnatal maternal care involving lactation (the defining characteristic of the Mammalia).1

Length of gestation period and developmental state at birth varies among mammals with infants generally categorised into one of two types. Altricial infants are the least developed at birth; typically born in litters following a relatively short gestation period they are hairless, sightless and deaf. Such altricial infants are sequestered in nests for safety and warmth while they undergo a period of rapid growth and maturation. They are fed infrequently by mothers who produce milk that is high in fat and which takes an infant several hours to digest. In contrast, precocial infants are born singly or in pairs, and are well developed at birth with fur, sight, hearing, and limb co-ordination. Typical precocial infants can stand and walk within a short period after birth. Precocial* infants are therefore able to maintain close proximity with their mothers, sucking frequently and at will, while the milk they consume is relatively low in fat but high in calories (lactose) providing energy in a quickly digested form.2

Among the primates (the order to which humans belong) monkey and ape infants fall into the precocial category – born following a relatively long gestation period with fur, vision, hearing, and the ability to cling to their mother from birth. Human infants then, conform by consequence of evolutionary relatedness to this precocial primate pattern, being born with hair, sight and hearing. Yet human infants also display what are known as ‘secondarily altricial’ characteristics – primarily lack of neuromuscular control – a consequence of the limits imposed on gestational brain development by the evolution of the human pelvis. Human infants are born with a brain that is only a quarter of its adult volume (compared to 50% for infant chimpanzees and gorillas) due to the constraints of a birth canal that has been modified to accommodate upright walking. Although displaying many precocial traits, therefore, human infants are dependent upon a caregiver for maintaining close proximity, and for the regulation of physiological

---

1. Precocial animals are active and mobile from birth, such as antelopes.
functions such as temperature and breathing during the first few months of brain development.\textsuperscript{2,3} Human milk has a similar composition to that produced by other precocial primates, relatively low in fat and protein, but high in sugar (in the form of lactose).\textsuperscript{4} It is milk that is “designed” for infants who suckle frequently and of their own volition day and night. Due to their inability to cling, however, human infants are dependent upon their mothers to ensure that proximity is maintained. Ethnographic data from societies around the world confirm that mothers in traditional human cultures are in contact with their infants 24 hours a day, carrying them strapped to their bodies by day, sleeping beside them at night,\textsuperscript{5} and feeding at will. Consideration of the human neonate from an evolutionary perspective throws the recent history of infant care in our own society into sharp relief.

‘...the modern Western custom of an independent childhood sleeping pattern is unique and exceedingly rare among contemporary and past world cultures.’\textsuperscript{6} Since the mid-1930s, prolonged and independent night-time sleep has been the hallmark of a ‘good baby’ in many Western societies; early infant independence is viewed as a developmental goal, and its achievement as a measure of effective parenting.\textsuperscript{7,8} Yet for the majority of the world’s cultures, separation of an infant from its mother for sleep is considered abusive or neglectful treatment for which sand

Among health practitioners a different set of meanings are in common use; here, bed-sharing is sometimes taken to include room-sharing with the infant’s cot near the bed, parents and infants sleeping on adjacent mattresses. Under this definition bed-sharing is a sub-set of co-sleeping, but not all co-sleeping is bed-sharing. And bed-sharing means sleeping for at least some of the night in the same bed as a parent or parents. Among researchers, ‘co-sleeping’ refers to parents and infants sleeping in close proximity, but not necessarily on the same surface: this could therefore include room-sharing with the infant’s cot near the bed, parents and infants sleeping on adjacent mattresses. Under this definition bed-sharing is a sub-set of co-sleeping, but not all co-sleeping is bed-sharing. And bed-sharing means sleeping for at least some of the night in the same bed as a parent or parents. Among researchers, ‘co-sleeping’ refers to parents and infants sleeping in close proximity, but not necessarily on the same surface: this could therefore include room-sharing with the infant’s cot near the bed, parents and infants sleeping on adjacent mattresses. Under this definition bed-sharing is a sub-set of co-sleeping, but not all co-sleeping is bed-sharing. And bed-sharing means sleeping for at least some of the night in the same bed as a parent or parents.
breastfed. UK mothers identified ‘ease and convenience of breastfeeding’ as their overwhelming reason for keeping their infants in bed. Other reasons included the enjoyment of close contact with their baby; anxiety regarding their baby’s health; ease of settling a fractious baby; and a family bed parenting philosophy. In one case, parents slept with their newborn out of necessity rather than choice.

Breastfeeding, bed-sharing and infant sleep

New mothers are often unprepared for either the frequency with which their breastfed newborns need to feed, or how long night-time breastfeeding is likely to continue.28,23 breastfed babies are generally still feeding as frequently throughout the night at three months of age as they were at one month.29,23 It has been recognised by various authors that frequent night waking is a factor contributing to the introduction of formula milk to babies, thereby undermining breastfeeding given the common (but perhaps erroneous32) perception that formula use promotes sleep. For those committed to breastfeeding, sleeping with their babies becomes one of the means by which mothers cope with frequent night-time feeding and later settling.33,22,26

It was previously observed that mothers who started bed-sharing in their babies’ first month of life were twice as likely to still be breastfeeding when their baby was 4 months of age, in comparison with women who breastfed their baby in the absence of early bed-sharing.23 It was unclear, however, whether mothers with a commitment to long-term breastfeeding were predisposed to bed-sharing at the outset – or whether there was a physiological connection that linked bed-sharing with breastfeeding success. Previous research indicated that when babies bed-share they suckle more frequently at night than when sleeping in their own space.34 As frequent suckling is well-established as a key factor associated with the successful establishment of breastfeeding, close-contact sleeping arrangements have the potential to enhance breastfeeding rates. Yet standard postnatal ward care (rooming-in) means that babies sleep separately from their mothers in cots.

In order to examine how mother-infant sleep contact might contribute to the establishment and continuation of breastfeeding, Ball et al35 conducted a randomised controlled trial (RCT) in a UK hospital. Complete details of the trial protocol can be found in the clinical report.35 Overnight videos were made of mother-baby dyads randomised to 3 sleep locations for their postnatal ward stay: (1) baby in the standard cot at mother’s bed; (2) baby in a side-car crib attached to mother’s bed; (3) baby in mother’s bed with rail attached to bedside— known as the cot, crib, and bed conditions, respectively. This trial found that babies in the bed or crib exhibited significantly more frequent attempted and successful feeds than those infants in the cot, with no significant differences found in feeding frequency measures between the bed and crib conditions.35 The use of the stand-alone cot impeded breastfeeding by introducing a barrier between mother and baby preventing contact; inhibited the baby’s ability to root and initiate suckling; obscured the baby’s cues from the mother; and by its height prevented mothers from retrieving their babies without either assistance or the need to get out of bed, thereby substantially hampering the ease and speed of maternal response.

Prompt response to babies’ feeding signals and frequent suckling in the early neonatal period are essential elements in ensuring successful milk production—a process controlled by the hormone prolactin.36,37 The mother produces more prolactin each time her baby attempts to feed, so frequent attempts are key. Facilitating close maternal–baby proximity during the nights following birth is especially important since breastfeeding at night triggers greater prolactin release than daytime feeding.36,39 Initial copious milk production (lactogenesis II) is modulated by the amount of prolactin secreted, and frequent stimulation of prolactin secretion in the period between birth and lactogenesis II increases subsequent milk production;40 infrequent suckling is associated with delayed lactogenesis II.41,42 The link between frequent early

<table>
<thead>
<tr>
<th>TABLE 1: Bed-sharing prevalence (up to 6 months of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Van Sleurwen et al (2003)</td>
</tr>
<tr>
<td>Tuohy et al (1998)</td>
</tr>
<tr>
<td>Gibson et al (2000)</td>
</tr>
<tr>
<td>Rigda et al (2000)</td>
</tr>
<tr>
<td>Ball (2002)</td>
</tr>
<tr>
<td>Brenner et al (2003)</td>
</tr>
<tr>
<td>Blair &amp; Ball (2004)</td>
</tr>
<tr>
<td>Bolling et al (2007)</td>
</tr>
<tr>
<td>Ateah &amp; Hamlyn (2008)</td>
</tr>
<tr>
<td>Lahr et al (2005)</td>
</tr>
</tbody>
</table>
suckling and the timing and volume of copious milk production via prolactin explains the physiological mechanism linking mother-infant sleep contact with improved breastfeeding initiation.43

In addition to being critical for breastfeeding initiation, high initial prolactin levels are also important for successful long-term lactation. The maintenance of lactation is dependent upon the adequate development of prolactin receptors in breast tissue44 resulting from frequent feeding in the early days after birth.45 Prolactin receptors are crucial in maintaining lactation following the switch from endocrine to autocrine control.46 This means that frequent early feeding will not only lead to effective establishment of milk production, but will enhance its continued maintenance. A common reason given by women for stopping breastfeeding is a perceived or real insufficiency in breastmilk production,25 suggesting inadequate prolactin receptor development in the initial phases of breastfeeding. As this may be a consequence of infrequent feeding bouts, particularly at night, we hypothesised that those infants sleeping in close proximity to their mothers on the postnatal ward in the trial described above (bed or crib) would have better long-term breastfeeding outcomes than infants randomly allocated to the stand-alone cot. To test this hypothesis, telephone interviews at 2, 4, 8, and 16 postnatal weeks ascertained breastfeeding status following hospital discharge. Although all mothers initiated breastfeeding on the postnatal ward, at 16 weeks 43% of babies who were in a separate cot on the postnatal ward were still breastfeeding compared with 73% of the crib group and 79% of the bed group.43 Although this study was not powered to assess the impact of mother–infant sleep proximity on long-term breastfeeding outcomes, these indicative data suggested that such a trial was warranted; this trial is now underway and due to report in 2010. The evidence to date, however, reinforces the importance of mother-infant sleep contact in facilitating and supporting breastfeeding. Whether or not side-car cribs would be beneficial in the home environment or in the presence of certain bed-sharing contraindications (e.g. premature infants or extremely tired parents etc.) awaits the results of future research.

Safety aspects of bed-sharing
Some authorities suggest parent-baby bed-sharing is a questionable practice that should be abandoned by parents and discouraged by health professionals due to concerns regarding risk of SIDS and/or accidental death.47,48,49 Such recommendations acknowledge little or no value in mother–infant sleep contact. This view is primarily based on epidemiological studies that calculate the likelihood of SIDS or accidental infant deaths, based on the characteristics of babies who died compared with matched controls in large population-based studies. Babies sleeping on their front, parental smoking, poverty, and young maternal age are all well-known factors that are associated with an increased risk of unexpected infant death.50 However, estimates of the relative risk of SIDS in the context of bed-sharing vary widely. Although McKenna51 hypothesised a protective effect of bed-sharing on SIDS-risk based on an evolutionary perspective, epidemiological studies have only found a protective effect for room-sharing (co-sleeping). Assessments of the impact of bed-sharing on SIDS-risk in the UK range from no increased risk to babies of non-smoking parents to a 12-fold increase for infants sharing a sofa for sleep with a parent who smokes.52 The picture is obscured because studies from different countries use different criteria to define bed-sharing53,54,55,56 and have produced a confusing array of statistics that cannot easily be compared.57,58 Hauck et al.53 for instance, included parents and other carers in the same bedsharing category in her study of bedsharing in Chicago, while the ECAS (European Concerted Action on SIDS) study54 defined bedsharing as sleeping with one or both parents. A Scottish case-control study of SIDS55 included in the cases of ‘bedsharing deaths’ not only those infants found dead in an adult bed, but also infants who died in a cot but who had been in their parents bed previously the same night, while a recent Irish case-control study56 included sofa-sharing deaths in the bedsharing definition. These varying definitions means that in attempting to ascertain what are the truly risky elements of bedsharing that parents should be warned of we must dig deeply into the ways the various studies were conducted and not simply rely upon the authors’ (or media’s) headline conclusions. Furthermore, these studies consistently ignore infant feeding data in calculating relative risks associated with bed-sharing. Until more appropriate data are collected it is impossible to ascertain whether breastfeeding–related sleep contact between mothers and babies constitutes a risk to babies. However, it is unlikely that any potential risk would be of great magnitude59 given that breastfeeding is associated with a reduced SIDS risk compared to formula-feeding in several studies.53,60,61

The key issues underpinning conflicting views of bed-sharing revolve around WHO is bed-sharing; the circumstances under which bed-sharing is taking place (WHERE and HOW), and the way in which bed-sharing is conducted (WHAT).

Numerous publications on mother-baby sleep behaviour have documented how mother–baby dyads who routinely bed-share and breastfeed sleep in close proximity with a high degree of mutual orientation (facing one another) and arousal overlap (waking at the same time) (see62 for comprehensive review). In recent years these studies have been replicated in at least three different settings, and breastfeeding dyads have been observed displaying consistent bed-sharing behaviour, regardless of whether they slept in a narrow hospital bed, a full-size bed in a sleep lab, or at home in beds ranging from twin to king-sized.63,64,65 Mothers sleep in a lateral position, facing their baby, and curled up around them. Babies, positioned level with their mother’s breasts, sleep in the space created between the mother’s arm (positioned above her baby’s head) and her knees (drawn up under her baby’s feet).63,64,66 The cumulative results of these studies provide a robust understanding of breastfeeding–related bed-sharing behaviour and suggest that mothers’ characteristic sleep position represents an instinctive behaviour on the part of a breastfeeding mother to protect her baby during sleep.67 Although this behaviour evolved in a very different sleep.
context than involving Western beds and bedding, the principle of infant protection is no less effective. When breastfeeding mothers sleep with their babies they construct a space in which the baby can sleep constrained by their own body, protected from potentially dangerous environmental factors—be they predators, cold weather, the suffocation hazards of quilts and pillows, or the overlapping risk of bed-partners.

Breast-feeding babies of breastfeeding mothers appear, then, to avoid the presumed hazards of sleeping in adult beds (e.g., suffocation, overlying, wedging, entrapment), due to the presence and behaviour of their mothers. Interestingly, however, differences have been observed in bed-sharing behaviour between breastfeeding and formula-feeding mothers and babies. In a study comparing families videoed sleeping in their home environment, formula-fed infants were generally placed high in the bed, with babies at parental face-height, and positioned between, or on top of, parental pillows. In contrast, breastfed babies were always positioned flat on the mattress, below pillow height and level with the mother’s chest. Formula-feeding mothers spent significantly less time facing their baby and in mutual face-to-face orientation than did breastfeeding mother–baby pairs, and they did not adopt the ‘protective’ sleep position with the same degree of consistency. Breastfeeding mothers and babies experienced a significantly greater frequency of arousals from sleep, and significantly more of these were synchronous (mother and baby from sleep, and significantly more of these mothers and babies experienced a degree of consistency. Breastfeeding the ‘protective’ sleep position with the same orientation than did breastfeeding their baby and in mutual face-to-face

References