

Understanding Mother-Infant Cosleeping With Breastfeeding As Adaptation Not Pathology: Toward A New Scientific Beginning Point (2001)

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"Breastfeeders are three times more likely to bed share and appear to differ from non-breastfeeding bedsharers on several characteristics. These data do not link bedsharing to risk of SUDI". (1)

"The findings suggest that it is not bedsharing per se that is hazardous but rather particular circumstances in which bedsharing occurs". (2)

Introduction

This paper examines several important conceptual issues related to the biological functions of mother-infant cosleeping, as well as critical aspects of the controversy surrounding the relationship between bedsharing and SIDS. A definition of safe mother-infant cosleeping (as distinct from safe and unsafe bedsharing) is proposed to potentially reconcile and make more precise the nature of discourse in this research area. Just as most researchers accept without question the necessity of distinguishing between safe and unsafe cribs and safe and unsafe ways to place infants to sleep alone in cribs, we call attention to the need to distinguish between safe and unsafe beds and bedsharing. Short-term beneficial physiological effects of cosleeping are reviewed, and results from a NICHD funded behavioral and physiological study of Latino mother-infant bedsharing are presented to illustrate why blanket recommendations against bedsharing (3-5) are inappropriate and scientifically unjustified. Data summarized here collected among low risk mother-baby pairs provide the basis of speculations that, in otherwise safe physical and social circumstances, routine bedsharing with breastfeeding might reduce the risks of SIDS among some infants, in some cultural groups (6-9).

Toward Clarifying Definitions and Discourse on Mother-Infant Cosleeping: Taxonomy of Cosleeping Vs. Bedsharing Vs. Dangerous Conditions

Mother-infant cosleeping represents the preferred and obligatory sleeping arrangement for most contemporary people and under most circumstances this arrangement continues to provide maximum protection and nutrition (through nighttime breastfeeding) for the highly neurologically immature and slow developing human infant. As breastfeeding rates push to all time highs in western countries (10) mother-infant cosleeping is rapidly becoming the arrangement of choice for many urban western parents, as it appears that breastfeeding and bedsharing are mutually reinforcing (1, 11,12).

Despite this fact, so variable is the range of "factors" associated with especially one type of cosleeping i.e. bedsharing which significantly influences outcomes, no single recommendation to bedshare either as a way to reduce SIDS or to enhance the nighttime attachment behaviors shared between parents and their children is appropriate at this time; but neither is it appropriate, we argue, to recommend in an unqualified way against bedsharing, or to advise that infants should "never" sleep with their parents. Such an unqualified recommendation confuses species-wide normal, healthy human behavior i.e. forms of mother-infant cosleeping practiced safely by millions of human beings, with dangerous pieces of furniture, structures, and/or dangerous social conditions, and confuses adaptive behavior (cosleeping) with behavioral pathology.

In the context of SIDS and pediatric sleep research we propose that the term cosleeping be used generically to describe a diverse, but proactive, generalized class of sleeping arrangements, and not to any one particular "type" of cosleeping arrangement as, for example, bedsharing per se (but see below). One step toward standardizing a definition of safe mother-infant cosleeping that can be extended to include situations where high levels of mother or caregiver-infant body contact occurs during sleep, is to apply the description safe cosleeping to particular "types" of sleeping arrangements in which at least one proactive responsible, adult cosleeper (whether mother or not) takes safety precautions unique to the particular "type" of cosleeping practiced; and, regardless of whether sleeping occurs on the same or a different surface with another adult present, the cosleeping dyads potentially are able to communicate through multiple, but minimally two mutually reinforcing sensory modalities as, for example, through a combination of at least tactile and visual, or auditory and olfactory, or visual and auditory, and/or auditory and vestibular sensory channels.

Safe mother-infant cosleeping can be applied to bedsharing situations where the overall bedsharing context (physical setting and social circumstances including triadic situations) are made as safe as current knowledge permits, and where at least one adult cosleeper/caregiver not only is present, but in addition to being physically capable of potentially detecting and responding to changes in the baby's status, the cosleeper is motivated and willing to do so. Sleep location per se such as infants sleeping alone on an adult bed without a parent present *sensu* Drago and Dannenberg (3) and Nakamura et al. (4) is not considered bedsharing, using this operational definition.

As proposed here, a safe cosleeping environment must always provide the infant with the opportunity to "sense" and respond in turn behaviorally and/or physiologically to the caregiver's signals and cues as, for example, to the mother's smells, breathing sounds, infant directed speech, sleep or breathing movements, invitations to breastfeed, touches or to any as yet unidentified "hidden" sensory stimuli whether intended or not. In this way, bedsharing is not necessarily excluded from being considered one type of 'safe cosleeping' but nonetheless, like other specific "types" of cosleeping, bedsharing needs further to be taxonomically differentiated into one of two sub-types: safe or unsafe. Although the same can be said for almost any sleeping arrangement such as solitary crib sleeping, bedsharing is probably practiced slightly differently in each household. Yet, now we can identify specific, modifiable "bedsharing risk factors" as well as "crib risk factors" (2-4,13) that should help to eliminate unnecessary risk regardless of location or arrangement.

Cosleeping In Form, Function and Outcome: A Many Diverse Thing

We maintain that sleep location is but the beginning not the end point for analysis in studying sleeping arrangements, and that all "types" of cosleeping must be distinguished by the condition and composition of sleeping structures or pieces of furniture or materials which are used, including characteristics of the sleep surface (hard, soft, fibrous, textured or smooth) and by the bedding materials including infant sleep wrappings, night clothes and/or blankets, as well as by who and/or how many people are sleeping close to, with or by, the infant or child.

Compared with solitary infant sleep, analytically important features of the cosleeping environment are more numerous and more complex. For example, in the bedsharing environment it appears that the quality of care the infant receives from the caregiver once in bed is partially determined by the nature of their social relationship outside of the bed, which often helps to explain the parent's reasons for cosleeping. For

example, mandatory, non-elected bedsharing by smoking mothers that occurs in socially chaotic households where bedsharing is the only option lead to outcomes quite different from those situations in which bedsharing is elected by a non-smoking mother specifically to protect, nurture and breastfeed her infant, under more routine, stable social circumstances (1,2,14-16).

Only recently have we started to address the impact of particular adverse circumstances on the bedsharing environment. Amongst parents of infants who have died unexpectedly in Great Britain the prevalence of alcohol consumption, cigarette smoking and the use of illegal drugs was also higher, whilst the infants exhibited adverse clinical features at birth (prematurity, low birth weight). Moreover, during their short lives these doomed infants experienced more infections and lower daily weight gains, suggesting increased vulnerability from the beginning (2 and 17 for theoretical overview). Treating bedsharing as a starting point in which risks occur, rather than as a crude end-point, Blair et al (2) found no evidence to suggest that bedsharing was a risk amongst parents who did not smoke, or among infants four months or older (see 1 for corroborating USA data).

In another study in St. Petersburg, Russia, compromised maternal attachment is found associated with many babies who died while bedsharing. Physicians of the dead infants indicated that the mothers of deceased infants had been less eager "to quiet or comfort" their infants in general, and while their infants were being examined (by the physician) before their deaths these mothers "paid less attention to the baby's responses" and were less willing or likely to touch or look at them, compared with matched control mothers whose babies lived (18).

Bedsharing, Room Sharing, Sofa and Recliner Use, as Particular "Types" of Cosleeping

Bedsharing is just one of many forms of cosleeping, and while all bedsharing represents a more intimate type of cosleeping, not all cosleeping takes the form of bedsharing. Moreover, safe bedsharing can now be distinguished from unsafe bedsharing. For these reasons "cosleeping" and "bedsharing" are not synonymous and should not be used interchangeably, a distinction not acknowledged by Drago and Dannenberg (3) and Nakamura et al (4) in their recent condemnation of "cosleeping" and "bedsharing".

Bedsharing is complicated because it involves different furniture components sometimes articulated but sometimes not. Adult beds mostly include mattresses usually but not always surrounded by other pieces of furniture such as wooded or metal frames. Sleeping in or on a bed represents one of the major contexts within which cosleeping among westerners is likely to take place. Bedsharers sleep on at least one, and sometimes two types of mattresses, (a box spring under a cloth mattress in many western societies) although cloth mattresses can sit on the floor without a frame, which for infants prove dangerous if positioned next to a hard wall or surface. The space between a wall and a mattress can lead to the infant's head becoming wedged causing asphyxiation, a major category of mechanical death reported by Drago and Dannenberg (3).

In western societies cosleeping can also occur on sofas, recliners, on child beds, or daybeds, or even while the adult sits or sleep on chairs which recline, or rock. In some areas in the United States, these types of infant deaths are lumped into the category of bedsharing/cosleeping deaths (as in Michigan, USA) which makes less precise the understanding of the dangers posed by any one sleep environment, and significantly misrepresents and exaggerates the numbers of deaths associated with true bedsharing.

As regards sofa-or couch cosleeping, cosleeping on waterbeds or on a recliner, colseeping on these types of structures proves to be highly risky (2, 4).

Room Sharing As A Form of Cosleeping

Room-sharing between infants and parents increasingly is the norm in many western countries and is associated with increased protection against SIDS, although studies showing the protective effects of room-sharing did not include data on the actual proximity of infants to their caregivers, or if mothers were breastfeeding. Nevertheless, depending on whether or not the infant and parent can see and/or hear, and/or smell each other, and if the caregiver intends to monitor and respond to an infant, room-sharing can be considered another form of safe cosleeping, although there is, of course, a spatial distance outside of which caregiver-infant sensory exchanges which define cosleeping (as proposed here) are impossible.

Epidemiological data show that in the presence of an adult caregiver room-sharing infants are four times less likely to die from SIDS than are infants sleeping either alone, or in the same room with siblings (19); and similar results are reported in the CESDI study conducted in Great England and reported by Blair et al (2, 20). Indeed, the CESDI study suggests that infants who sleep in a separate room alone are more likely to die from SIDS than are those infants who bedshare for part of the night, and who remain in the room close to the mother (2). For example, in a univariate analysis of the CESDI data set in which separate room sleeping in a cot /crib was the reference group (OR 1.00) with 95% CI, the odds ratio for babies room sharing was 0.51 (0.35,0.74). Partial bedsharing was 0.33 (0.19,0.57), while for those infants found bedsharing the OR was 1.49 (0.99,2.24). The highest odds ratio was calculated for sofa sleeping, 15.79 (4.43,56.24) (16).

SIDS Bedsharing Epidemiology And Catastrophic "Overlays" Occur Mostly, (Often Exclusively) In The Context Of Extreme High Risk: Infant Friendly Adult Beds and Elimination of Dangerous "Factors", Not "Practice", is Called For

Blair et al (2, 20) argue against a simplistic analysis of expected "outcomes" associated with bedsharing. Using data collected during the CESDI study in Great Britain that includes 325 SIDS and over 1300 controls, Blair (20) proposes an *a priori* epidemiological model which examines bedsharing behavior *not as a risk factor itself, but as a particular kind of environment within which specific risks may or may not appear*. An analogy is that rather than concluding, for example, that crib sleeping is a risk factor for SIDS because some parents lay there baby prone for sleep, covering their infant's heads, in cribs, or use risky loose sheet covering or poorly fitted soft mattresses, it is not appropriate to conclude, therefore, that crib sleeping is a risk factors for SIDS, only that there are safe or unsafe ways to use cribs.

No data support the idea that bedsharing among non-smoking parents increases the risks of SIDS (21). In fact, similar to other epidemiological studies, a high percentage (84 %) of SIDS mothers in the CESDI study smoked after the infant was born. A high percentage (66%) smoked during pregnancy, 68% after, while 28% of SIDS mothers breastfed their baby's for at least 4 weeks, compared to 40% of the controls (2). This means that it could not be determined if bedsharing in combination with breastfeeding among non-smoking mothers might prove protective (2), as our research team has hypothesized. Non-smoking, breastfeeding and bedsharing mother-baby pairs are

consistently under-represented in SIDS populations especially in urban settings, making it difficult to assess the potential protective effects of multiple positive factors which promise, we argue, improved outcomes associated with bedsharing.

The Origins of Mother-Infant Cosleeping: How Do We Know That “Cosleeping” Remains “Biologically Appropriate”?

Supine Infant Sleep Likely Emerged to Facilitate Breastfeeding During Nighttime Mother-Infant Cosleeping

The near cultural universality of the supine infant sleep position, the single most important factor known to reduce the chances of an infant dying from SIDS, can best be explained by understanding that it functions to facilitate breastfeeding, when expressed within the micro-environment within which it evolved: the mother-infant cosleeping/breastfeeding context. That is, the supine infant sleep position evolved in tandem with breastfeeding, and indeed studies show that without instruction the supine infant sleep position by the infant is chosen by the breastfeeding mother nearly 100% of the time, compared with instances in which the infant is placed in a crib to sleep alone (22).

Human infants appear pre-sensitized, as if biologically "expecting" to receive sensory signals linking them to a cosleeping partner, signals such as breathing (vesicular) sounds (23), chest movements (24-26), smells of mother's breastmilk (22) and touches (27), all of which have been shown to change human infant physiology including heart rate and breathing patterns including the cessation of excessive nighttime human infant crying (28) in clinically advantageous ways.

Indeed, in the face of no explanation, the best chance of determining how and why supine infant sleep might be protective should begin by first acknowledging that sleep position is but one factor in a constellation of other factors (arousals, sleep stage progression and duration, body orientations, feeding, touching and movement patterns, time asleep, time awake, body temperature, vocalizations) which mutually regulate each other when the breastfeeding mother infant dyad sleeps in close enough proximity, changes argued by researchers other than ourselves to be protective against SIDS (29, see Tables 1 and 2).

From The Perspective of the Breastfeeding Mother-Infant Dyad: What Does It Mean To “Bedshare”?

Over a fifteen year period our research team conducted three separate studies of mother-infant bedsharing (6-9, 30-35). These empirical studies challenge the validity of many widely-held models concerning what constitutes "normal and healthy" infant sleep and under what conditions "normal infant sleep" can be quantified and defined. In our most recent in-house laboratory study our research team quantified differences in the sleep behavior and physiology of 70 mothers and infants. This study involved over 105 separate nights in the laboratory, 155 eight hour infra red video recordings, and 210 separate mother and infant (eight hour) polysomnographic recordings as nearly exclusively breastfeeding mothers and their infants shared a bed or slept apart (in adjacent rooms), over three successive nights per pair(see 5 for methods and details).

Breastfeeding In The Solitary and Bedsharing Environments

The "choice" to cosleep specifically in the form of mother-infant bedsharing was found to double not only the number of breastfeeds, but increase by threefold the total nightly durations of breastfeeding and to significantly shorten the average intervals between the breastfeeding sessions (36, and Figures 1 and 2).

We found also that without instruction, the routinely bedsharing breastfeeding mothers almost always placed their infants in the safe supine infant sleep position, probably because it is difficult if not impossible for the mother to breastfeed a prone sleeping infant. For these reasons, we argued that bedsharing promotes increased breastfeeding with potentially significant health gains for the baby and the mother, and possibly reduces the chance of the infant dying from SIDS, since breastfeeding while bedsharing practically mandates the use of the safe supine infant sleep position, at least among Latina breastfeeding/bedsharing mothers.

Increased protection from SIDS through breastfeeding is not universally established (37) but at least half the studies show it as being protective, and since no two studies use the same definition of breastfeeding, research in this area remains difficult to compare (36). In the United States a major multi-center epidemiological study found that "not breastfeeding" was a risk factor for SIDS for both Black and White American populations (39). Only one epidemiological study, however, has looked at whether dose-specific response effects exist and whether they are stable across races and socioeconomic groups in relationship to SIDS. Their data support the possibility that increased breastfeeding leads to increased protection from SIDS. Fredrickson et al (39) found that for both black and white Americans the risk of SIDS decreased for every month of breastfeeding. Conversely, for white mothers the risk of SIDS increased by 1.19 for every month of not breastfeeding, and 2.0 for every month of non-exclusive breastfeeding. For Black mothers, the risk of SIDS also increased by 1.19 for every month of not breastfeeding, but 2.3 for every month of not exclusively breastfeeding.

Sleep Architecture, Mother and Infant Arousal Patterns in the Bedsharing and Solitary Sleep Environments

These differences in feeding patterns between infants in the solitary and bedsharing environment cannot properly be understood outside of the overall context within which they find expression. Increased breastfeeding is but one of a cascade of inter-dependent changes involving arousals, sleep stage duration and progression, mother-baby body orientation and sleep position in bed, breathing and infant crying, all mutually regulating factors as mothers and infant sleep alongside each other in bed (see Figures 3 and 4 for overviews). For example, we found that in general small EEG defined transient infant arousals are facilitated in the bedsharing environment, albeit selectively, and that even when routinely bedsharing infants slept alone they continued to exhibit more transient arousals than did routinely solitary sleeping infants, sleeping alone (9, Tables 1 and 2). Furthermore, bedsharing significantly shortened the amount of time per bout infants remained in deeper stages of sleep (Stage 3-4) compared with when they slept alone, with increases in the amount of time spent in Stage 1 and 2, and more total time asleep (8). Together, these findings justify our speculation that the increased number of arousals in the bedsharing environment, coupled with the reduced amount of time (per bout) spent in deep Stage 3-4 sleep where arousal thresholds for infants are highest, may reduce an infant's chances of dying from SIDS especially among infants born with arousal deficiencies.

We also documented an acute sensitivity on the part of the routine bedsharing mothers to their infant's presence in the bed. That is, compared to the number of temporally overlapping arousals (in which the infant aroused first), routinely bedsharing mothers exhibited significantly more arousals than did routinely solitary sleeping mothers while bedsharing with their infants. This finding argues against the possibility that bedsharing mothers habituate to the presence of their babies and, thus, may pose a danger to them while asleep (9, 34).

While routinely bedsharing mothers aroused and fed their infants more frequently while sleeping next to them, on average they received as much sleep as solitary breastfeeding mothers and infants slept significantly longer than they did when they slept alone (8,9,34). Moreover, 84% of the routinely bedsharing mothers evaluated their sleep following their bedsharing night in the laboratory as being either good or enough, while only 64% of routinely solitary sleeping mothers evaluated their sleep as being either good or enough following their routine, solitary sleep night in the laboratory (34 and Table 2).

In two earlier studies we found that bedsharing mother-infant pairs exhibited a trend toward greater simultaneous overlap in all sleep stages (i.e., stages 1-2, 3-4, and REM). This synchronization of sleep states was not explained by chance and is not found when the sleep/wake-activity of infants is compared to randomly selected mothers with whom they did not co-sleep (30,40).

Conclusions

From Debate To Discourse

The "debate" over bedsharing i.e. to bedshare or not to bedshare should be transformed from debate to discourse. Discussions about infant and childhood sleeping arrangements by pediatricians, pediatric sleep researchers, SIDS researchers, health and government authorities should move away from the assumption that a singular recommendation is appropriate, and away from the mistaken belief that bedsharing (as one type of cosleeping) is a uniform practice with any predictable, singular outcome. To be specific, this new discourse on bedsharing needs to reject the traditional epidemiological categorization of "bedsharing" as a discrete unitary variable, which carries a fixed, relative risk across all circumstances leading invariably either to good or bad outcomes.

The continuum of parent-infant sleep proximity: Infants do not, after all, sleep in the same place, all night, every night!

This new discourse needs also to reject the assumption that any particular sleeping arrangement is necessarily practiced in an all-or-nothing manner-all night, every night, in the same way, throughout each stage of infancy or childhood development across the first five or so years of life. Ample evidence exists now suggesting that even where parents consider themselves either cosleepers or solitary sleepers often they incorporate a variety of sleeping arrangements which can vary from night to night, and/or from one part of a night, to another (41-44). In transaction with the infant/child's changing social, emotional, and cognitive needs and sleep behavior, and changing parental attitude, experiences, and understandings of their own and their child's needs, sleeping arrangements more-or less fluctuate (in many families) around what is perhaps best conceptualized as a continuum of parent -infant sleep proximity. This continuum can be conceptualized as ranging from the most intimate, high contact

forms of sleeping arrangement i.e. parent-infant cosleeping occurring on the same surface, side-by-side, often with baby-controlled breastfeeding, to infants sleeping physically distant from the caregivers, routinely in a crib in its own room, all night, every night. Health educational programs and written materials aimed at teaching parents how to arrange a safe sleep environment-should appreciate and accommodate the potential fluidity of sleeping arrangements in any given family, and entertain the possibility that many, perhaps most, infants are likely to experience diverse sleep locations and arrangements, and, therefore encounter a rich variety of sensory and physical circumstances hypothetically imagined by this model. Sometimes, parents never make a firm decision about where their baby will sleep (41); but when and where sleep happens parents should be alert and made knowledgeable of the special precautions they need to take as different, perhaps each, point on this continuum of parent-infant sleep proximity is encountered.

Identifiable Bedsharing and Cosleeping “Problems” or Hazards Are Worth Solving Too!

It is important that health and governmental authorities understand that there are different ways to approach and solve the "problems" or hazards associated with any given sleep environment, and that how or if certain hazards are thought worth solving will depend on one's own values and preferences, as well as on one's own early childhood sleeping experiences which may differ from the experiences of others. It is not so much tolerance but respect that is called for in reaching consensus on relevant areas of this controversy, specifically respect for scientific and parental positions which differ from, and legitimately challenge the more traditional culturally-based views which disparage and recommend against every and all kinds of cosleeping or bedsharing. This means that the preparation of written materials on safe infant sleep environments need to include diverse health professionals and scientists whose training and experiences reflect the needs of the diverse communities for whom recommendations are intended. Those families who elect to bedshare deserve every bit as much support, encouragement and education as those parents who choose to place their infants to sleep in cribs.

"Factors" Not Practice, Dangerous Conditions, Not Dangerous Parental Bodies

By distinguishing between cosleeping in a generic sense and particular forms of cosleeping such as sofa cosleeping and safe and unsafe bedsharing, health professionals can preserve and acknowledge the importance of parents and infants sleeping within arm's reach (cosleeping) – perhaps on different but sometimes on the same surfaces – while simultaneously recognizing that under specific conditions especially among the urban underclass where most of the bedsharing deaths occur, specific types of cosleeping can be dangerous, just as placing infants in specific types of cribs under specific types of conditions, in certain kinds of ways (prone, for example) is also dangerous.

That catastrophic accidents can and do occur in the bedsharing or cosleeping environment is not affirmation of the legitimacy of anti-bedsharing rhetoric, or evidence that such catastrophes must occur, or likely will occur, for any given mother-infant pair. The existence of catastrophic accidents cannot be used as the argument against all bedsharing anymore than catastrophic accidents associated with crib sleeping should constitute an argument against all crib sleeping. Risks are dependent on who is involved and how and why the practice takes place. One thing is certain: only when health professionals and governmental regulatory agencies agree that cosleeping can be a

good choice for parents will there ever be attention paid to constructing, by design, safe child-adult beds, and associated supportive bedding, structures or furniture.

Conclusion

The first step in reconciling social and scientific biases is to acknowledge that they exist. We have argued here that scientific and social biases have dominated and severely limited the discourse in regards to the question: where should infants and children sleep? It is hoped that this essay will facilitate a major shift away from traditional thinking about legitimate sleeping arrangements among infants and children, particularly concerning the larger related question about what constitutes, healthy, safe and satisfying infant-child sleep – a shift that will include the idea that cosleeping can be one of several "healthy" choices, especially where parents are provided supportive education as to how to make that choice, and practice that choice, safely. Educating parents about bedsharing and crib risk "factors", rather than condemning either practice, is in our opinion the best public health strategy. Surely, health professionals have a responsibility to provide the type of educational context within which a comfortable exchange of information between interested parents and health professionals can occur. Indeed, a century of psycho-biological studies documenting developmental benefits associated with maternal-infant contact among primates indicate that there is no scientific justification for beginning cosleeping or SIDS studies with the *a priori* understanding that increased sleep contact between the human mother-and infant (when in a bed) is inherently dangerous, and likely leads to social, emotional, or sleep-related disadvantages, disorders or death.

While some may choose to solve the hazards associated with crib sleeping, others, including parents, will continue to choose to solve the problems associated with bedsharing. It is time to respect with equal enthusiasm and resources the alternative values that underlie the choice to cosleep – a time-tested sleeping arrangement that refuses to go away, and for all good reasons (45,46).

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Tables

Tables 1 Effects of Bedsharing On Infant Sleep

Table 2 Effects of Bedsharing On Maternal Sleep.

Figures

- Figure 1. Number of Episodes of breastfeeding, mean duration per episode, and total average nightly duration of breastfeeding among routinely bedsharing and routinely solitary sleeping mother-infant pairs, on their bedsharing and solitary sleeping nights in the sleep laboratory. Abbreviations: RB-BN (**R**outine **B**edsharers on their **B**edsharing **N**ight); RB-SN **R**outine **B**edsharers on their **S**olitary **N**ight); RS-BN (**R**outine **S**olitary sleeping pairs on their **B**edsharing **N**ight); RS-SN (**R**outine **S**olitary sleeping pair on their **S**olitary **N**ight).
- Figure 2 Mean Interval Between Breastfeeding Episodes On The Bedsharing Night (BN) and The Solitary Sleeping Night (SN) For Routinely Bedsharing (RB) and Routinely Solitary Sleeping (RS) Mother-Infant Pairs.
- Figure 3 For The breast fed infant, "Choice" by the mother, to cosleep sets in motion a cascade of potentially beneficial, inter-related, bio-behavioral effects which doubles the amount of breastfeeding, and regulates almost every major physiological and behavioral system (from the infant's perspective).
- Figure 4 For the breastfeeding mother, the choice to cosleep sets in motion a cascade of short-term potentially, inter-related bio-behavioral effects, that can in addition to suppressing mother's ovulation through increased breastfeeding, provide long term increased protection from breast and ovarian cancers.