Bottle feeding simulates child loss: Postpartum depression and evolutionary medicine

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Summary

At the level of a mother’s basic biology, the decision to bottle feed unwittingly mimics conditions associated with the death of an infant. Child loss is a well-documented trigger for depression particularly in mothers, and growing evidence shows that bottle feeding is a risk factor for postpartum depression. The implications of this hypothesis for infant feeding practices, hospital procedures that lead to intermittent separation between mothers and infants during the immediate postpartum period, parallels between an increased desire to hold infants by mothers who bottle feed and responses to infant death among non-human primates, and the relationship between weaning and depression are discussed in the context of an emerging discipline known as evolutionary medicine.

Evolutionary medicine

Growing evidence shows that knowledge of human evolutionary history and mismatches between evolved adaptations and different aspects of our contemporary existence can have important medical and epidemiological implications [1]. For instance, population differences in the susceptibility to lung disease appear to be related to early geographical differences in the reliance on fire for warmth and food preparation and resulting selection due to differences in the inhalation of smoke as a byproduct of combustion [2]. There is also growing evidence that impregnation as a consequence of exposure to unfamiliar semen (i.e., infrequent insemination by the father) increases the risk of preeclampsia and other forms of spontaneous abortion [3].

Evolutionary medicine also applies in the psychological domain. Research on paternal resemblance shows that men are far more likely than women to invest preferentially in children with whom they share common facial features [4,5]. A clear implication of such findings is that matching phenotypic features of children being considered for adoption with those of their adoptive fathers could be used to improve adoption outcomes.

Bottle feeding

The present paper focuses on the decision people make to unwittingly depart from one of the defining features of mammalian evolution: to bottle feed rather than breastfeed their infants. For 99.9% of human evolutionary history the decision not to breastfeed would have been tantamount to committing infanticide. The technology that lead to bottle feeding as a substitute for the breast (e.g., bottles, rubber nipples, formula) has only become available within the last 100 years. Nowadays, the decision to bottle feed can be made by design (e.g., out of a concern for the effect on the mother’s figure, embarrassment about breastfeeding in public, time constraints due to employment) or by default (e.g., physical inability to breastfeed or where the mother produces inadequate breast milk).

With the advent of bottle feeding technology, there was a decline in breastfeeding in this country and elsewhere during the past century [6], but as significant advantages of breastfeeding for both the infant and the mother have become evident [7,8] the pendulum has begun to swing in the opposite direction. The focus of this paper, however, is not on the advantages of breastfeeding per se, but rather on the negative psychological consequences of the decision not to breastfeed.

Lactation

Pregnancy triggers a variety of hormonal changes that prepare the mammary glands to produce milk to meet an infant’s immunological and nutritional needs. Across the course of pregnancy, the breasts change internally and externally in response to prolactin, lactogen, estrogen, progesterone, ACTH, and growth hormone [9], with lactation kept at bay by high levels of circulating progesterone and oestrogen [10]. Lactation is triggered by the rapid drop in progesterone following placental birth, but other changes including the release of prolactin and oxytocin, along with cortisol, thyroid-stimulating hormone, and additional hormones are implicated in this process [9].
Once begun, lactation is largely maintained by prolactin, although oxytocin is responsible for the milk ejection reflex (MER), and is released into the mother’s bloodstream at every feeding [9,11]. After lactation is established, however, prolactin does not dictate milk production volume. Suckling alone removes very little breast milk. Instead, the MER triggered by oxytocin release provides the largest proportion of breast milk consumed [11]. The MER initially requires physical stimulation (suckling) but eventually becomes conditioned, and can be activated or inhibited by various cues [10]. Once conditioned, women can experience milk ejection, and the concomitant release of the lactogenic hormones oxytocin and prolactin, from merely thinking about, smelling, or hearing their baby cry [12].

If the MER is inhibited, milk remains undrained in the breast, and autocrine mechanisms work to inhibit milk secretion [10]. With complete cessation of milk removal, secretory capacity is eventually lost, although relactation is possible through breast and nipple stimulation [13].

Since milk production is dependent on removal of milk from the breasts when complimentary foods are introduced into the infant’s diet, milk production is reduced. This starts the process of weaning, whereby infants move from a diet consisting exclusively of breast milk to a mixture which is predominantly complementary foods. The death of the mother from her baby during the initial postpartum period could also serve to simulate child loss and contribute to or prime subsequent postpartum depression.

Conclusion

Bottle feeding practices and hospital procedures that simulate child loss may increase the risk of postpartum depression and fall within a growing number of medical issues that could benefit from an evolutionary perspective.

Conflict of interest statement

None declared.

References

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