BREASTFEEDING AND POSTPARTUM MATERNAL SEXUAL FUNCTIONING: A REVIEW

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ABSTRACT: In this paper we review the existing literature on the relationship between breastfeeding and postpartum maternal sexuality. Latency to resumption of sexual activity and frequency of sexual activity, sexual desire, dyspareunia, fatigue, mood and depression are used as discrete categories for discussion. The research literature indicates that women who breastfeed, as compared to those who bottle-feed, are more likely to experience decreases in sexual functioning, especially desire. Research increasingly suggests that various factors modulate the influence of breastfeeding on sexual functioning, including psychosocial and hormonal variables. Of particular interest is the potential association between hyperprolactinemia in breastfeeding women and sexual functioning, as mediated by its effects on both androgen and estrogen secretion. The limitations and deficits of past research, practical implications of these findings, and future directions for research are discussed.

Key words: Breastfeeding Sexual functioning Sexual desire Prolactin Androgens

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INTRODUCTION

Research on sexual functioning has proliferated over the past few decades, stimulated by an increasing awareness of the high incidence of sexual difficulties in both men and women. Sexual functioning is now recognized as a multidimensional phenomenon, influenced by many biopsychosocial factors. Pregnancy and the postpartum period (typically defined as the first six months after birth; von Sydow, 1999) are, along with puberty and menopause, among the most salient times in a woman's sexual life span. Given their psychological, physical, and hormonal associations, these phases are of considerable interest to the study of female sexuality. Past taboos surrounding the sexual functioning of expectant and postpartum mothers discouraged research in this area. For example, Reamy and White (1987) point out that traditional obstetrics textbooks prohibited sexual intercourse from 6 weeks before to 6 weeks after delivery. With more accurate scientific information about the negligible risk posed by pre- and perinatal sexual activity, these taboos have been relaxed considerably over the last half-century. This article provides an overview of past and current literature on how breastfeeding, and the hormonal changes associated with it, influence maternal sexual functioning during the postpartum period. Other reviews have described normative sexual practices during pregnancy and the postpartum period (e.g., von Sydow, 1999) but, to our knowledge, no review has incorporated the current understanding of hormonal factors.

In general, sexual functioning typically declines during pregnancy, and remains low during the postpartum period for many women. It is often a year post birth before pre-pregnancy levels of sexual interest and activity are regained (Alder & Bancroft, 1988). During the postpartum period, maternal sexuality may be affected by any number of variables, including hormonal changes, breastfeeding, psychosocial variables such as energy level, body image, well-being, sexual attitude, adjustment to changes in social roles, relationship quality, and mood changes that may be

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Sexual difficulties experienced postpartum by the new mother and/or her partner can cause much distress, due in part to the influence of sexual functioning on quality of life, physical and mental well-being, and relationship functioning. This last issue has far-reaching implications as lack of communication and understanding about one’s sexual relationship can escalate to greater relationship problems. A decline in postpartum sexual functioning may be particularly troublesome if sexual expression has previously been highly valued and integral to the woman’s self-concept and relationship with her partner. In other cases, changes in sexual desire and expression may be ego syntonic, whereby any decline in sexual functioning by the woman does not interfere with her well-being or cause distress.

For some time, postpartum sexual concerns lacked professional recognition, with health care providers focusing exclusively on the infant’s adjustment. As sexuality has come to be understood as a valued aspect of a woman’s life throughout her entire reproductive cycle, this has begun to change; however, many physicians and postnatal care workers are still lacking in the knowledge base and clinical skills to relay important information about postpartum sexuality to their clients. Few women with postpartum sexual problems report discussing them with a health professional, with the number reported being as low as 15% in one study (Barrett et al., 2000). Rates of consultation for sexual problems, as well as education surrounding the factors that might contribute to these changes (especially breastfeeding) need to be improved to address the unmet needs of postpartum couples, whose sexual relationship appears to be particularly vulnerable to change (von Sydow, 1999). Moreover, clinical experience suggests that sexual dysfunction commonly starts postpartum (e.g., Alder, Cook, Davidson, West, & Bancroft, 1986), as many women who seek sex therapy relate the onset of their sexual problems to this period.

As breast milk is considered to be the ideal food for newborns, women are encouraged to breastfeed if possible and a significant number do so, from very brief to fairly extended periods of time. Thus, any investigation and/or dissemination of knowledge of postpartum sexual functioning should incorporate a consideration of the influence of this practice. In order to disentangle the influence of breastfeeding from other postpartum variables, women who are lactating must be compared with those who are not. Noting the physiological and hormonal differences between the two groups is useful, but does not fully elucidate the effects of breastfeeding on maternal sexual functioning. It is expected that the psychosocial impact of breastfeeding, which depends on the mother’s and her partner’s personal reactions to nursing, might cause further divergence between lactating and non-lactating women.

The body of research on breastfeeding and sexual functioning is diverse, including contributions from psychology, psychiatry, endocrinology, obstetrics and gynecology, nursing, and midwifery. Our focus is on empirical studies which investigate the hormonal, cognitive, and behavioural aspects of women’s postpartum sexual functioning in relation to breastfeeding status. However, due to the paucity of research surrounding hormonal factors and breastfeeding, our discussion of this aspect is somewhat limited compared to psychosocial factors. As the continuation of lactation in the postpartum period is dependent upon suckling, lactating women are, by definition, breastfeeders and non-lactating women bottle-feeders. We will use the terms breastfeeders and lactating women interchangeably, as these terms emphasize the behavioural and hormonal aspects of breastfeeding, respectively.

The division of sexual response into the phases of desire, arousal, and orgasm as theorized in Kaplan’s (1979) triphasic model is implicit in our discussion of maternal sexuality, as many studies assess functioning in each of these stages separately. Other common measures of sexual functioning in the body of literature include latency to resume sexual intercourse or activity, frequency of intercourse, and occurrence of dyspareunia, which is defined as recurrent or persistent genital pain associated with sexual intercourse, causing marked distress or interpersonal difficulty (American Psychiatric Association, 1994). As will be evidenced shortly, sexual difficulties are not as compartmentalized as these discrete measures suggest, with problems tending to transcend across
sexual phases and behaviours. However, throughout this article the term “sexual functioning” will be used periodically, and is meant to signify the combination of sexual desire, frequency, enjoyment, and orgasm, a definition initiated by Kenny (1973).

**Postpartum Endocrinology**

Physical factors related to delivery, such as perineal trauma, are likely better predictors of sexual functioning earlier in the postpartum period, whereas psychological factors may better explain sexual functioning patterns later on, once any injuries have healed. This review is concerned with the hormonal substrate of these latter psychological changes. As such, we will begin by briefly summarizing the status of the key hormones likely influencing sexual functioning in the postpartum period: estrogen, progesterone, prolactin, oxytocin, and the androgens.

After rising nearly 100-fold during pregnancy, estrogen and progesterone levels decline sharply at birth. These levels remain low in breastfeeding women, whose continued lactation suppresses the hormonal peak and valley pattern of normal menstrual cyclicity. The resumption of ovulation is inhibited by suckling as long as breastfeeding is complete (McNeilly, 2001), and is likely due to multiple factors acting on the hypothalamic-pituitary-ovarian axis, including the hypersecretion of prolactin. Prolactin’s main effect during the postpartum period is to maintain milk production, and its levels both surge following each suckling episode and remain chronically elevated as long as suckling continues (Gard, 1998). While the mechanisms by which prolactin affects the hypothalamic-pituitary-ovarian axis have not been fully elucidated, it has been suggested that prolactin receptors located near the gonadotropin-releasing hormone (GnRH) neurons in the hypothalamus, and/or the reduction of tuberoinfundibular dopaminergic neurons (the principle source of dopamine, which inhibits prolactin secretion), may be acting to inhibit pulsatile secretion of GnRH, which would, in turn, suppress ovarian steroid production (McNeilly, 2001).

Persistently low levels of estrogen as seen in breastfeeding women are associated with a decrease in vaginal lubrication and genital vasocongestion, as well as atrophy of the vaginal epithelium. In addition to impairing physiological sexual arousal, these changes can cause dyspareunia and adversely affect the psychological experience of sexual arousal (Meston & Frohlich, 2000). Furthermore, there is a strong association between hyperprolactinemia, chronically elevated prolactin, and a marked suppression of sexual drive and gonadal functions in both men and women (Krüger, Haake, Hartmann, Schedlowski, & Exton, 2002). In women, it has specifically been associated with amenorrhea, infertility, and decreased sexual activity (Meston & Frohlich, 2000). Although pathological cases such as prolactin-secreting tumours (Lundberg & Hulter, 1991) have provided much of the evidence supporting this relationship, it is reasonable to assume that this evidence would apply to the hyperprolactinemia of lactation as well. The negative correlation between prolactin and sexual desire is however not universal, as some women with high levels of prolactin do not report decreased desire and normal prolactin levels do not guarantee uninhibited sexual desire (for a review, see Regan, 1999).

Oxytocin causes the contraction of breast myoepithelium and milk ejection, and, like prolactin, remains elevated after birth in breastfeeding women. The increase in oxytocin that accompanies suckling is under positive feedback control, i.e., continued suckling stimulates continued secretion. Unlike prolactin release, oxytocin release is prompted not only by the tactile stimulation of suckling, but also via visual neural input and a classic neuroendocrine conditioned reflex, involving playing with the infant, which is inhibited by stress (Shoupe & Mishell, 1997). Oxytocin is released during labour to help induce uterine contractions; it also facilitates uterine contractions during orgasm (Meston & Frolich, 2000). It remains to be determined whether oxytocin directly influences human female sexual desire or arousal. Evidence from non-human species indicates that central administration of oxytocin facilitates sexual receptivity (e.g., Gorzalka & Lester, 1987).

Androgens (e.g., testosterone, androstenedione, and dehydroepiandrosterone) are considered to be the major hormonal determinant of sexual desire in both women and men. Androgens are secreted by both the adrenal cortex and ovaries, and a woman’s experience of sexual desire is dependent upon baseline amounts (see Regan, 1999, for a review).
Furthermore, there is evidence to suggest that exogenous administration of testosterone to women who do and do not have normal ovarian functioning has the ability to increase both sexual desire and arousal-pleasure responses (Shifren et al., 2000; Tuiten et al., 2000). Elevated prolactin levels resulting from lactation are associated with a generalized suppression of ovarian functioning (McNeilly, 2001), and this suppressive effect would extend to ovarian androgen secretion as well.

Androgens from the adrenal cortex are also likely to be reduced in lactating women as adrenocortical output seems to be reduced in this group. Breastfeeding women show less hypothalamic-pituitary-adrenal (HPA) axis response to stressors than do bottle-feeding women, as evidenced, for example, by their attenuated adrenocorticotropic hormone (ACTH), cortisol, vasopressin, epinephrine, and glucose responses to treadmill stress at 7 to 18 weeks postpartum (Altemus, Deuster, Galliven, Carter, & Gold, 1995). The elevated prolactin and oxytocin levels of the postpartum period may explain this decreased stress reactivity. For example, experimental evidence in rats suggests that prolactin acts as a neuromodulator of the stress response, as central administration of prolactin attenuated the increase in plasma ACTH normally associated with HPA-axis response in the elevated plus-maze (Torner, Toschi, Pohlinger, Landgraf, & Neumann, 2001). Human evidence also suggests an inverse correlation between hyperprolactinemia and serum cortisol levels in women (Ferreira et al., 1995). In addition, administration of exogenous oxytocin in humans has been shown to inhibit cortisol release by the adrenal glands (Legros, Chiodera, & Greenen, 1988). Consistent with this finding, lactating women’s cortisol levels have been shown to be attenuated during breastfeeding sessions (Amico, Johnston, & Vagnucci, 1994). Since any change in HPA-axis activity affects adrenocortical output generally, episodic adrenal androgen secretion would be reduced in breastfeeding women in response to stressful situations and/or to suckling.

**Methodology of Literature Review**

Relevant databases (e.g., PubMed, PsychINFO, MedLine) were searched for research articles investigating postpartum maternal sexual functioning.

The search was restricted to studies that addressed the impact of breastfeeding on maternal sexual functioning during the postpartum period at least one month after delivery and that assessed one or more of the following parameters: resumption of sexual activity, frequency of sexual activity, sexual desire, and dyspareunia. While most of the selected articles were empirical studies, some theoretical discussions and literature reviews were also included. Search terms included: breastfeeding, suckling, or lactation; and postpartum, perinatal, puerperium, or (child) birth; and (maternal) sexuality, sexual behaviour, sexual activity, or sexual function(ing); and hormones, androgens, prolactin. Studies that were excluded included those that considered neurotransmitters rather than hormones, only looked at sexuality during the period of pregnancy, or investigated postpartum functioning, but didn’t assess sexual variables (e.g., body image, or relationship satisfaction). Some studies which did not appear in the relevant databases were taken from the reference sections of journal articles already collected.

Although methodologies varied among the studies on postpartum sexuality reviewed here, some methodological trends and commonalities were noted. Generally, interviews and semi-structured questionnaires assessing sexual functioning were administered to a convenience sample of postpartum women recruited at hospitals. Baseline measurements on parameters of interest were often initiated during the second or third trimester of pregnancy. Sample sizes varied greatly and subject selection was rarely random. This latter methodological drawback plagues sex research generally: subjects may not be representative of the population in general, as participation depends on a willingness to divulge intimate details of sexual functioning. Non-random selection and attrition compromise the generalizability of the findings and may be accentuated by differential access to recruitment in hospitals. Selection criteria typically required subjects to be healthy adult English speakers whose infants were also free of health problems. Most studies were confined to women in relationships, although responses of their sexual partners are occasionally included. While some studies are cross-sectional, longitudinal designs that compare breastfeeding to bottle-feeding matched at weeks postpartum are more common. Regardless of
prospective methodology, the majority of studies require women to compare their current sexual functioning to recalled pre-pregnancy levels.

The majority of research surveyed was descriptive in nature and relied on self-report. Studies looked at the impact of various factors on such sexual functioning variables as latency to resume sexual intercourse, frequency of sexual intercourse, sexual desire, sexual response, and dyspareunia. Many studies controlled for the effects of potential confounds, such as fatigue, mood, and relationship quality, and some measured hormonal variables. The focus of this review is on the relationship between breastfeeding and measures of sexual functioning.

Our discussion of the relationship between breastfeeding and sexual functioning assumes that breastfeeding is full rather than partial. It is worth emphasizing that the greatest hormonal differences between lactating and non-lactating women are dependent on full breastfeeding, which is when breast milk is unsupplemented by formula. Breastfeeding typically becomes supplemented prior to its complete cessation and suckling frequency decreases, at which time the hormonal differences between breastfeeders and bottle-feeders begin to collapse. For example, prolactin levels decline once breastfeeding becomes supplemented, and ovarian follicular activity and menstrual cycles are more likely to resume in partial breastfeeders.

**LITERATURE REVIEW**

From the outset, women who opt to breastfeed and continue with the practice are likely to differ in personality and environment from those who do not. For example, it is possible that women who breastfeed are more comfortable with their bodies at all life stages, or perceive their breasts as more than a focus of eroticism and sexuality. Different factors seem to predict non-initiation of breastfeeding and its early cessation. While 63% of a large sample of 906 postpartum women reported having breastfed, 40% stopped before three months had elapsed (Bick, MacArthur, & Lancashire, 1998). Women who did not initiate breastfeeding were more likely to be multiparous and unmarried, and to have had a general anaesthetic during delivery. Early cessation was influenced more by environmental factors such as returning to work before three months postpartum and receiving regular childcare from female relatives, as well as higher depression scores. In another study, women who breastfed for longer were more positive about breast changes, less negative about leaking breasts, and reported that the nursing bra interfered less with their sexual relationship than women who weaned earlier (Avery, Duckett, & Frantzich, 2000).

**Early Studies**

Masters and Johnson (1966) pioneered research comparing breastfeeders with bottle-feeders both physiologically and subjectively on measures of sexual functioning. They found that at 4 to 5 weeks postpartum, breastfeeders, as compared to bottle-feeders, exhibited a pattern of steroid starvation (i.e., a significant reduction in production of estrogens and androgens by the ovaries) associated with thinner vaginal walls. Breastfeeders were more likely to report levels of sexual desire within the normal range for nonpregnant women at 6 to 8 weeks compared to bottle-feeders. They also resumed ovarian steroid production later than bottle-feeders, but ovarian functioning differences were no longer apparent by 3 months postpartum. Overall, the breastfeeders reported higher levels of postpartum eroticism and resumed sexual intercourse with their partners earlier than did bottle-feeders. This pattern also characterized the 24 of 111 subjects interviewed during pregnancy and the postpartum period who persisted in breastfeeding through the second month postpartum. The simple dichotomy of breastfeeding versus not breastfeeding is however problematic and represents a serious methodological flaw in this and other early studies. Breastfeeding is not an all-or-nothing phenomenon; the degree varies, with some women being partial feeders and some women being full feeders, and it is reasonable to assume that the extent of breastfeeding's impact on the sexuality of the new mother may vary accordingly.

Falicov's (1973) study indirectly corroborated Masters and Johnson’s (1966) findings in that breastfeeding women returned to or even surpassed their prepregnancy levels of sexuality more readily than bottle-feeders. In contrast, a comparison of breastfeeders and bottle-feeders by Robson, Brant and Kumar (1981) found that breastfeeding did not significantly influence maternal sexuality.
Kayner and Zagar (1983) were the first researchers to conclude that breastfeeding decreases desire. Importantly, these authors were also the first to differentiate between unrestricted breastfeeding, defined as the dual purpose of feeding and comforting the child, and restricted breastfeeding, which is scheduled, supplemented, or involves using other devices such as soothers to comfort the child (Kayner & Zagar, 1983). The self-selected 121 women who completed and returned a retrospective questionnaire all were, or had been unrestricted breastfeeders, as defined by night-time nursing at the child’s will. They were asked to recall their pre-pregnancy sexual functioning and compare it with their sexual functioning when amenorrhoeic and nursing, whether or not that was still the case. Sixty-three percent of the respondents reported experiencing less or no sexual desire while amenorrhoeic and nursing, with only 26% experiencing the same desire and 13% experiencing more. These findings differ significantly from those of Masters and Johnson (1966), who observed breastfeeders experiencing significantly higher levels of sexual tension or desire than bottle-feeders. Kayner and Zagar (1983) concluded that breastfeeding reduces sexual desire and that steroid starvation and the resultant coital discomfort seemed the most likely cause. This important finding is somewhat compromised by the study’s questionnaire return rate of only 48% and its failure to classify subjects by weeks postpartum or to include comparison data from women who exclusively bottle-fed from the first day postpartum.

Later Studies

Although important for initiating the discussion of postpartum maternal sexuality, the numerous design flaws of these early studies render their findings virtually uninterpretable. With a growing recognition of the hormonal differences between lactating and non-lactating women (as well as other differences), formerly accepted methodologies have been mostly supplanted by studies that statistically compare breastfeeders with bottle-feeders. Ideally, the subjects are rigorously matched on weeks postpartum. Although generally representing methodological improvements especially in terms of prospection, the more recent research often continues to have shortcomings, such as lack of hormonal assays, lack of statistical control of relevant psychosocial variables, and reliance on retrospective self-report. Some studies address the effects of lactation and compare breastfeeders with bottle-feeders, but others do not. Overall, research from prospective studies with large sample sizes conducted during the last two decades tends to show that there is a reduction in sexual activity during pregnancy and a slow return to pre-pregnancy levels during the first postpartum year, with breastfeeders usually slightly behind their bottle-feeding counterparts. Postpartum sexual functioning problems are primarily those associated with the presence of pain or difficulty in the early months, with fatigue and lack of sexual desire becoming of chief concern after 2 months postpartum (Glazener, 1997). As time passes, the sexual functioning of women not using contraception may also be disrupted by anxiety caused by the risk of another pregnancy.

SEXUAL FUNCTIONING VARIABLES

Resumption of sexual activity. Latency to resume sexual intercourse after childbirth is possibly the most studied measure of postpartum sexual functioning, since it is easily identifiable and not confounded by the fluctuations of many other measures. Gynecologists advise that intercourse can usually be safely resumed when the lochial loss has ceased at approximately 3 to 4 weeks after delivery (lochia is the tissue, cells, blood, and bacteria discharged from the vagina after birth) (Masters & Johnson, 1966). In practice, intercourse is resumed an average of 6 to 8 weeks postpartum in Europe and the United States, slightly after noncoital sexual contact is resumed between 2 and 5 weeks (for a review, see von Sydow, 1999). For many couples, the resumption of intercourse may be problematic at first due to discomfort or pain. In addition to cessation of lochial loss, resumption of intercourse has been linked to age, with mothers under 30 starting earlier (Elliot & Watson, 1985), marital status (i.e., having a sexual partner), and the absence of severe vaginal laceration (Grudzinskas and Atkinson, 1984), and multiparity, as those with other children resume sooner than do first-time parents (Fischman, Rankin, Soeken, & Lenz, 1986).

Alder et al. (1986) found that bottle-feeders tended to resume intercourse earlier and with higher frequency than breastfeeders. Overall, the longer women breastfeed, the longer the delay in resuming intercourse (e.g., Alder & Bancroft, 1988), although
somewhat earlier studies using poorer methodologies have found no such relationship (Fischman et al., 1986; Grudzinskas & Atkinson, 1984). More recently, Hyde, DeLamater, Plant, and Byrd (1996) found that breastfeedingers resumed intercourse on average a week later than bottle-feeders and were significantly less likely to have resumed intercourse by 1 and 4 months postpartum. Although less likely to be engaging in intercourse, breastfeedingers did not differ from bottle-feeders in the incidence of masturbation, fellatio, or cunnilingus, suggesting that breastfeeding did not significantly decrease desire for sexual stimulation in general.

Frequency of sexual activity. The pattern of sexual intercourse is typically characterized by a decrease in frequency during pregnancy and no or minimal activity in the 2 or 3 months postpartum, followed by a slight increase. In one of the few studies assessing sexual activities other than intercourse, von Sydow, Ullmeyer, and Happ (2001) found that this pattern also applied to breast stimulation. In their German sample, French kissing and tenderness only showed a slight decline during pregnancy, female masturbation was constant until parturition when it dropped to zero and increased again postpartum, and male masturbation remained constant throughout. Generally, sexual practices have been shown to change little postpartum, but frequency and satisfaction with sexual relations decrease as compared to pre-pregnancy (Barrett et al., 1999). Frequency of sexual intercourse is reduced for both breastfeedingers and bottle-feeders during the first year postpartum relative to pre-pregnancy levels (von Sydow, 1999), remaining at half the pre-pregnancy baseline for about 9 months (Stern & Leiblum, 1984). Some studies also report a decline in oral sex by both partners (e.g., Barrett et al., 2000).

Stern and Leiblum (1984) found that bottle-feeders were significantly more coitally active than breastfeeding women by 5 to 8 weeks postpartum. Prolactin levels in breastfeeding women, who all had high levels, were negatively correlated with frequency of sexual intercourse, although not significantly. In those women who continued to breastfeed past the eighth week postpartum, a significant negative correlation between nursing frequency per day and coital frequency per week emerged; however, this relationship did not apply for those women who breastfed at night only (Stern & Leiblum, 1984).

Improving methodologically upon the majority of previous research, Forster, Abraham, Taylor, and Llewellyn-Jones (1994) conducted a prospective, within-subjects diary study of psychosexual changes related to breastfeeding. Their 19 subjects were primiparous women who had been fully breastfeeding for 6 to 23 months and intended to cease within 3 months, none of whom breastfed at night or used oral contraceptive pills (OCPS). Diary data were collected for 2 months before and 2 months after weaning. In the 4 weeks after weaning, sexual activity and frequency of sexual intercourse increased significantly. Although factors such as perineal comfort and the woman’s expectations did not account for these changes, a concurrent significant improvement in fatigue and mood confound the results and cannot be ruled out as influential. In addition, a return almost to baseline levels occurred within 8 weeks, suggesting that the changes may be temporary; however, it is likely that women completing daily records readjust to the new baseline after a few weeks of change.

In a recent study of the psychological factors influencing pregnant and postpartum sexuality, De Judicibus and McCabe (2002) had expectant and new mothers complete questionnaires measuring role quality, depression, fatigue, relationship satisfaction, sexual desire, frequency of sexual intercourse, and sexual satisfaction compared to recalled pre-pregnancy levels. Taking baseline pre-pregnancy levels into account, breastfeeding was significantly related to a greater reduction in frequency of sexual intercourse compared to bottle-feeding at 12 weeks postpartum. Breastfeeding effects were no longer apparent at 6 months postpartum, perhaps due to substantial attrition of this sample over the two times.

Sexual desire. For the majority of women, sexual desire declines over the course of pregnancy, and for many but not all women, this decrease from pre-pregnancy levels continues postpartum (for a review, see von Sydow, 1999). Postpartum women have been shown to exhibit a decline in sexuality, with a highly significant decrease in sexual motivation at 6 months compared to pre-pregnancy (Alder & Bancroft, 1988).
At first, it was unclear whether breastfeeding influenced postpartum desire, as earlier studies garnered inconsistent findings. Ryding (1984), using semi-structured interviews relying on comparison with recalled pre-pregnancy sexual functioning, found that decreased desire postpartum was unrelated both to breastfeeding and pain during delivery. However, in Stern and Leiblum’s (1984) sample, sexual desire was lower in breastfeeding women than bottle-feeders at week 5, although this difference did not reach significance. In another study, the “much less” or “less” desire for intercourse reported at both 4 and 12 months postpartum by almost half of the women responding to a couples survey was unrelated to breastfeeding (Fischman et al., 1986).

In their prospective study of 25 primiparous women during the first 6 months postpartum, Alder et al. (1986) used self-report diaries and interviews to relate behavioural to hormonal changes. This was the first study to systematically analyze hormonal influences associated with lactation. By 12 weeks postpartum, three quarters of breastfeeding mothers reported a reduction in sexual desire (one quarter rated it as severe), and diminished desire persisted until 6 months postpartum for just over half of the breastfeeding. In contrast, only one third of the bottle-feeders reported decreased desire, and none rated it as severe. In addition, testosterone and androstenedione were significantly higher in bottle-feeders than breastfeeding. The correlation between androgen levels and sexual functioning reached significance for women with severely reduced desire, who had significantly lower androgen levels. Women experiencing reduced desire did not differ significantly in prolactin levels, however. Since androstenedione and testosterone levels were both positively related to ratings of being sociable and cheerful, and negatively related with ratings of fatigue, the authors allow for the possibility that the sexual effect of reduced androgen levels may be part of a nonspecific effect on mood. Other limitations of this study include its relatively small sample size and lack of prospective pre-pregnancy hormonal assays, the latter allowing for the possibility that any androgen level differences across individuals preceded the difference in sexual interest. Regardless, the relationship between breastfeeding and lower androgen levels merits additional study, particularly in light of the extensive literature on androgens and sexual functioning prepartum.

In a more recent large longitudinal study of 570 pregnant women and 550 male husbands/partners who completed questionnaires pertaining to sexual functioning, Hyde et al. (1996) found that breastfeeding more frequently reported a lack of sexual desire than bottle-feeders at both 1 and 4 months postpartum. In addition, both bottle-feeders and their husbands gave higher ratings on several measures of sexual satisfaction than breastfeeding and their husbands. By 12 months postpartum, there were no differences between the two groups.

In the first study of randomly-selected postpartum women, Glazener (1997) administered questionnaires to a sample of 1116 women, garnering a high response rate. Breastfeeding, depression, and fatigue were all significantly related to lack of sexual desire at 8 weeks postpartum. Depression and fatigue did not fully account for low sexual desire, since lack of sexual desire was more than twice as common in breastfeeding than bottle-feeders irrespective of whether the women reported being depressed or fatigued. With the additive effects of these variables, breastfeeding were a full three times more likely to be uninterested in intercourse than bottle-feeders. By 12 to 18 months, desire did not differ between the women who were still breastfeeding and the bottle-feeders.

In Avery et al.’s (2000) longitudinal study, 576 breastfeeding primiparous women were interviewed and completed questionnaires at 1, 3, 6, and 12 months postpartum, or longer if complete weaning had not yet occurred. Just under three quarters of the subjects reported that it was somewhat, quite, or extremely important to them that sexual interest returned quickly. As breastfeeding duration increased, women reported significantly less sexual desire and more interference with the sexual relationship.

In summary, recent research has consistently found an association between breastfeeding and decreased desire, which might be mediated by androgen levels and exacerbated by an interaction with fatigue and depression. Prolactin levels, as well as HPA-axis hyporeactivity in the breastfeeding woman may
indirectly influence desire by acting to reduce ovarian and adrenal androgen secretion, respectively.

Dyspareunia. The implications of dyspareunia for sexual functioning are profound, as reflected by the fact that it is a significant predictor of diminished desire, frequency of sexual intercourse, and sexual satisfaction at 3 and 6 months postpartum (De Judicibus & McCabe, 2002). Although many studies have documented postpartum dyspareunia, few have sought to determine the relative importance of associated risk factors. Recently, a large study of primiparous women who delivered vaginally found that perineal trauma and the use of obstetric instrumentation were significantly related to dyspareunia in both its frequency and severity at 6 months postpartum (Signorello, Harlow, Chekos, & Repke, 2001). Dyspareunia at 3 months postpartum is more likely with vaginal delivery, although also experienced by women who give birth by Caesarean section (Barrett et al., 2000; Ryding, 1984), and, as would be expected, women who deliver by Caesarean section tend to resume intercourse faster than those with vaginal deliveries (Hyde et al., 1996). Dyspareunia has also been shown to be significantly related to the occurrence of pre-pregnancy dyspareunia (Barrett et al., 2000).

Dyspareunia can also be caused by vaginal dryness due to physical and/or psychological factors and the interplay between them. If intercourse becomes associated with an expectation of pain that results in anxiety and less sexual arousal, a cycle may be created that perpetuates the vaginal dryness and discomfort (De Judicibus & McCabe, 2002). Discomfort with intercourse is quite common initially - often reported at rates of more than half of women resuming intercourse (von Sydow, 1999) - and tends to resolve itself somewhat gradually over the first year postpartum, although there is some danger of the problem becoming protracted. In a survey mailed at 4 and 12 months postpartum, over half of the respondents indicated experiencing pain with intercourse at 4 months postpartum, while this number decreased to 16% at 12 months (Fischman et al., 1986).

As previously discussed, persistently low estrogen levels, such as those accompanying lactation, are associated with impairment of physiological sexual arousal in the form of decreased vaginal lubrication and genital vasocongestion, and atrophy of the vaginal epithelium. Indeed, at both 3 and 6 weeks postpartum, breastfeeders are more likely to report vaginal dryness than bottle-feeders (Kim, Alexander, Korst, & Agarwal, 2000). As the duration of breastfeeding increases, most breastfeeders experience decreased vaginal lubrication, which is a greater problem for women who breastfed for longer than 6 weeks postpartum than those who wean before this time (Avery et al., 2000). Although some earlier studies (e.g., Fischman et al., 1986) did not find a significant association, breastfeeding has now been consistently linked to higher rates of dyspareunia.

Alder and Bancroft (1988) assessed 91 primiparous women prospectively early in pregnancy and again at 3 and 6 months postpartum using structured questionnaires and interviews. Breastfeeders reported a lower preferred frequency of intercourse and enjoyment and experienced more pain during sex than bottle-feeders at 3 months postpartum. By 6 months, these differences had largely disappeared except for the occurrence of pain, although the fact that none of the breastfeeders were still fully feeding by this time leaves open the possibility that breastfeeding accounted for the other differences at 3 months as well. These authors were the first to strongly suggest that the pain associated with intercourse for breastfeeding women, whether their breastfeeding was full or supplemented, may be due not only to lower estrogen levels and the resultant decreased lubrication, but also to the reinforcing effect of inhibited arousal due to the anticipation of pain.

By 6 months postpartum, dyspareunia is no longer related to type of delivery, but is significantly correlated with current breastfeeding (Barrett et al., 2000), with average incidence rates across studies of 36% for breastfeeders and 16% for bottle-feeders (von Sydow, 1999). Some researchers report that breastfeeders are four or more times as likely to report dyspareunia than bottle-feeders at this time (Signorello et al., 2001).

PSYCHOLOGICAL FACTORS INFLUENCING SEXUAL FUNCTIONING
It is expected that breastfeeders and bottle-feeders might differ on measures of fatigue, mood, and
depression, all of which might confound or add to hormonal influences on sexual functioning.

Fatigue. Fatigue is affected primarily in the postpartum period by sleep disturbance related to night-time feeding. Night-time feeding may be more disruptive for breastfeeding than bottle-feeders, whose partners can share in the task. Indeed, breastfeeding typically report higher fatigue scores than bottle-feeders, and fatigue has been shown to reduce significantly 2 to 3 weeks after weaning from full breastfeeding, just before sexual activity increases (Forster et al., 1994).

Fatigue interferes greatly with sexual functioning, an effect that is very apparent to postpartum women themselves. In a large sample of women who breastfed for various durations, fatigue was the most common written attribute for their decreased sexual activity (Avery et al., 2000). Fatigue seems to interfere most with sexual desire, being highly correlated for at least a year postpartum (e.g., Alder & Bancroft, 1988; Fischman et al., 1986).

Mood. A positive correlation between oxytocin levels and measures of positive affect (Turner, Altemus, Enos, Cooper, & McGuinness, 1999) suggests that oxytocin may influence sexual desire indirectly inasmuch as positive mood and desire may be related. Lactation may also result in an improved mood state in breastfeeding women by acting centrally to reduce or increase particular neurotransmitters related to stress and anxiety such as the catecholamines, and gamma aminobutyric acid (an inhibitory neurotransmitter which plays a role in anxiety and behavioural reactivity), respectively (Carter, Altemus & Chrousos, 2001). Upon a review of the literature on postpartum mood, Carter et al. (2001) determined that breastfeeding women interact more positively with their babies, including smiling toward and touching their infants more, and are more likely to report positive mood states and less anxiety and depression than bottle-feeders. However, the evidence relating breastfeeding and mood to sexual functioning is mixed.

In Stern and Leiblum’s (1984) sample, mood at five weeks postpartum was significantly elevated for breastfeeding as compared to bottle-feeders, but sexual desire and physical state reports were lower. Other researchers (e.g., Alder et al., 1986) have found that breastfeeding and bottle-feed do not differ in mood. In contrast to what one might expect based on Carter et al.’s (2001) findings, Forster et al. (1994) found an improvement in mood two weeks after weaning that narrowly preceded an increase in sexual activity. If some aspects of mood are elevated in breastfeeding, they have not been conclusively shown to correspond to increases in sexual functioning.

Postpartum depression. Over half of all postpartum women experience transient emotional lability, with 10-15% experiencing postpartum depression and 0.1% puerperal psychosis (Russell, Douglas & Ingram, 2001). Loss of libido reliably accompanies postpartum depression (Bailey, 1989). More recently, postpartum depression has been associated with a lower frequency of intercourse (De Judicibus & McCabe, 2002) and found to be a highly significant predictor of loss of sexual desire in employed women at 4 months postpartum (Byrd, Hyde, DeLamater, & Plant, 1998). Although the overall incidence of a major depressive episode is not elevated in the first year postpartum, women with a history of major depression have an increased rate of relapse (Abou-Saleh, Ghubash, Karim, Krymski, & Bhai, 1998).

No consistent hormonal etiology for postpartum depression has been identified; however, the risk seems to be related to sleep disruption (Carter et al., 2001). An effect on limbic circuits due to continual sex steroid deprivation is also possible (Russell et al., 2001) given that estrogen is somewhat helpful as a treatment (Flores & Hendrick, 2002). A rapid decline in progesterone levels in the immediate postpartum may also predict depression in breastfeeding women at six months postpartum (Ingram, Greenwood, & Woolridge, 2003). Another explanation implicates the inhibition of corticotropin releasing hormone (CRH) secretion from the hypothalamus, which occurs in late pregnancy and often continues postpartum. As the first hormone in the HPA-axis cascade, CRH from the hypothalamus stimulates the anterior pituitary’s synthesis and secretion of ACTH in a pulsatile diurnal rhythm with episodic spurts, which in turn prompts steroid hormone production and release from the adrenal cortex. During pregnancy, placental secretion of CRH causes cortisol levels to increase dramatically.
in the mother, thereby down-regulating her own hypothalamic production of CRH. Once the placental source of CRH is removed, the new mother may continue to exhibit a hypoactive HPA axis (Carter et al., 2001). The resetting of the HPA axis and gradual recovery of CRH activity that normally coincide with the onset of the postpartum period may be disrupted and postponed in some women (Carter et al., 2001). A faulty CRH rebound, interacting with the dip in estrogen and progesterone levels, may cause postpartum depression, since all three factors have been linked to its etiology (Russell, Douglas, & Ingram, 2001). Specifically, hypofunctioning of the CRH system has been implicated in those with atypical depression, and studies have supported the idea that suppressed CRH activity is associated with postpartum mood changes in women who experience this symptom (Carter et al., 2001).

One might expect that the hypothalamic CRH mechanism may take longer to rebound in lactating women, as evidenced by their reduced HPA-axis reactivity, which could increase breastfeeding’s risk of postpartum depression. However, evidence relating breastfeeding to rates of postpartum depression is inconsistent. Early studies of breastfeeding and postpartum depression (e.g., Cox, Connor, & Kendell, 1982; Kumar & Robson, 1979) found no association; however, they considered breastfeeding as all or nothing. Noting that the pattern and extent of breastfeeding are important considerations, Alder and Cox (1983) evaluated the relationship between suckling frequency and postpartum depression by comparing full and partial feeders. Partial feeders were defined as those women who supplemented their breastfeeding before 12 weeks postpartum. Mothers who had fully breastfed for at least 12 weeks had a higher incidence of postpartum depression 3 to 5 months postpartum than those who partially breastfed. Full breastfeeding were the most depressed, and non-OCP using partial feeders, who were most likely to have returned to normal endogenous ovarian cycles, reported the fewest depressive symptoms. However, Alder and Bancroft (1988) found little evidence to suggest that breastfeeding are more at risk for postpartum depression than bottle-feeders.

Depressed women who have stopped breastfeeding report that the onset of their depression preceded the cessation of breastfeeding more often than followed it (Misri, Sinclair, & Kuan, 1997). However, Abou-Saleh et al. (1998) found that women experiencing postpartum depression had lower prolactin levels, and that breastfeeding had higher prolactin levels and lower rates of depression. Essentially, the risk of postpartum depression has not been conclusively shown to increase due to breastfeeding (Ingram, Greenwood, & Woolridge, 2003). Clearly this relationship merits additional study, as results across different studies are far from consistent.

DISCUSSION

Beginning with Masters and Johnson (1966), early studies on postpartum sexual functioning tended to find that women’s desire for intercourse returned rapidly, and that women who breastfed experienced the greatest desire for intercourse. The participants of the early studies were likely to be quite liberal in their sexual attitudes, and most of these studies were retrospective. Eventually, Robson et al. (1981) documented a substantial drop in desire for and frequency of intercourse after delivery, and Kayner and Zagar (1983) found that breastfeeding had lower levels of desire than bottle-feeders. Subsequently, researchers initiated more prospective studies, and a few began to perform hormonal assays on postpartum women (e.g., Alder & Bancroft, 1988). The findings converged to establish that women do have decreased desire for and frequency of intercourse postpartum; however, the influence of breastfeeding remained equivocal. Since the 1990s, research suggests more conclusively that breastfeeding is associated with a greater decline in sexual functioning than that experienced by bottle-feeders, especially with regards to decreased sexual desire and elevated rates of dyspareunia. Resumption latency and frequency of sexual intercourse seem to be less affected by breastfeeding, perhaps because they are less sensitive measures and more influenced by relationship factors and partner desires. Other than the relationship between low estrogen levels and dyspareunia, the factors affecting the sexual functioning patterns of breastfeeding have not been fully elucidated. The interaction of breastfeeding, low desire, and low androgen levels, which has been investigated by only one group of researchers, is greatly in need of
clarification. While nearly all research on postpartum sexual functioning is now prospective, it appears that studies aimed at understanding hormonal influences are no longer being performed and that researchers are studying the general trend of reduced desire in breastfeeding women with psychosocial measures.

Overall, the incidence of sexual dysfunction for breastfeeding women appears to be linked to breastfeeding duration. Women who breastfeed for a longer period resume intercourse later, exhibit more dyspareunia and less sexual desire, and report enjoying intercourse to a lesser degree than bottle-feeders or women who breastfeed for a shorter duration. Although no studies have shown a specific effect on responsiveness or orgasm, weaning has a positive effect on sexual activity. Breastfeeding’s influence on sexual functioning may be mediated at least partly by its effects on the hormones which influence vaginal dryness and/or a loss of sexual desire. Although breastfeeding is correlated with higher fatigue scores, breastfeeding’s influence on sexual functioning persists when researchers control statistically for the effects of fatigue. The evidence relating mood and depression to breastfeeding is mixed; therefore, their status as confounds of breastfeeding’s hormonal influence on sexual functioning remains inconclusive.

The elevated prolactin and oxytocin levels of breastfeeding women have various effects on sexual functioning. Prolactin’s ovarian suppression results in low levels of estrogen, decreasing lubrication and increasing the risk of dyspareunia, which is likely to result in anticipatory anxiety, less enjoyment, and decreased desire for intercourse. The secretion of ovarian androgens is also reduced. Prolactin and oxytocin release during suckling seems to add to this latter effect by acting to decrease breastfeeding women’s HPA-axis responsiveness, and likely their episodic release of adrenal androgens as well. Since female desire is highly correlated with androgen levels, decreased androgens in breastfeeders might account at least partially for their reduced desire.

Prolactin and oxytocin may also influence sexual desire through other pathways. Krüger et al. (2002) cite a series of studies from their laboratory revealing a significant twofold increase in plasma prolactin concentrations for over one hour following orgasm in both men and women. Prolactin levels remain unchanged following sexual arousal without orgasm. These results suggest that prolactin may play an important role in regulating sexual reactivity, controlling acute sexual arousal following orgasm. Indeed, Krüger et al. (2002) propose a theoretical model to this effect, whereby prolactin represents a peripheral neuroendocrine reproductive reflex, moderating sexual arousal and behaviour. The authors recognize that, although both men and women exhibit similar prolactin responses to orgasm, its impact may vary between the genders since they display differences in sexual functioning, such as refractory period characteristics. Nevertheless, the potential implications of these findings for lactating women, who experience elevated baseline prolactin levels and episodic surges with suckling, are profound. If indeed prolactin suppresses acute arousal, the motivation for lactating women to engage in sexual activity would be markedly reduced, with each suckling episode in particular inducing a type of refractory period potentially characterized by little sexual interest and even subjective feelings of sexual satiation. Similar evidence has been found involving oxytocin release during orgasm. Carmichael, Warburton, Dixon, and Davidson (1994) report a significant percentage change for oxytocin levels in men and women from arousal through to orgasm. In addition, they found a positive correlation between oxytocin level and orgasm intensity for both genders, thereby suggesting a possible relationship between oxytocin and sexual satiety as well.

**Limitations of the Existing Literature**

Evidence for the effects of breastfeeding on maternal sexual functioning remains somewhat discrepant, and it is likely that differing methodological approaches contribute significantly to the variance between data from existing research on breastfeeding and sexual functioning. Standardization would be wise to address both sample and design characteristics, as well as to address the postpartum woman’s sexual partner.

**Sample Characteristics**

Most samples are self-selected and homogeneous, thereby not representative of the population of postpartum women in general. Most of the studies have very low response rates and high dropout rates.
Samples tend to be composed primarily of older, upper class, heterosexual, married, Caucasian women from the United States. Researchers would benefit from attempting to diversify their samples to increase the validity of their conclusions.

The extent to which sample homogeneity affects the generalizability of findings is not entirely clear. However, women of higher socioeconomic status have been found to breastfeed for longer on average (Alder & Bancroft, 1988). The samples of most American studies are over 90% Caucasian (e.g., Hyde et al., 1996), and, while there is evidence to suggest little cross-cultural differences in when sexual intercourse is resumed postpartum (Odar, Wandabwa, & Kiondo, 2003; Zhang, Liu, Shah, Tian, & Zhang, 2002), the reasons for the delay may vary. For instance, in Adinma’s (1996) study of 352 Nigerian women, most women had resumed sexual intercourse by 6 to 11 weeks postpartum, but the longest mean resumption times were due to a cultural discouragement of sex during breastfeeding, or for family planning spacing purposes, reasons that are uncommonly reported in the United States or Europe.

**Relationship and Partner Variables**

A major limitation of many studies is that only women are assessed, and not their sexual partners. Sexual activity as it is typically defined in these studies (i.e., intercourse) takes two people; therefore, the partner’s attitudes represent an important factor to consider. A woman might engage in sexual intercourse merely to please her partner, and her partner may have his own issues related to birth and breastfeeding. Relationship satisfaction predicts both sexual satisfaction during pregnancy and sexual desire postpartum (De Judicibus & McCabe, 2002). In studies that do address the sexual partner, they typically only include husbands. Including more unmarried and lesbian couples would improve generalizability.

Christensen and Hertoft (1980) were the first to individually assess the male partner, an important step to reduce any confounding influence on the female of his altered behaviour. Both members of randomly selected couples expecting their first child were interviewed and completed questionnaires on sexual functioning. At six months postpartum, only 47% of the women reported unchanged desire from pre-pregnancy levels, as compared to 84% of the men. Although women were more likely to experience diminished desire, it is notable that 16% of the men did as well. Women who never or extremely rarely reached orgasm during intercourse, men who reported “feeling sad” for a period during the first 6 months postpartum, and couples who had experienced a marital crisis were overrepresented in the couples that reported sexual problems at 6 months postpartum.

**Design Flaws**

Measures of postpartum sexual functioning are largely unstandardized and rely on a limited set of outcome measures that often reflect a reductionistic view of sexuality as equivalent to intercourse (von Sydow et al., 2001). While desire is often assessed, initiation, motivation, and frequency of masturbation and fantasy are important factors that are often overlooked, especially in earlier studies (pre-1990s). Motivation may be particularly relevant as some women may be engaging in intercourse to appease their partners, rather than because of their own desire.

Studies often rely on retrospective self-report, and recall of pre-pregnancy levels of sexual functioning may be distorted by mood-dependent memory. If levels of sexual functioning during pregnancy are easier to recall than those of pre-pregnancy due to their recency, they may also confound self-reports. Even when studies are prospective, data collection is often infrequent and is terminated before it can be determined if problems have resolved themselves or become protracted. Future studies would benefit from consistent measurement of the differences between pre-pregnancy, pregnancy, and postpartum sexual functioning. As there appears to be a positive correlation between them, this methodology may help determine if there really is a significant difference in sexual functioning after birth. Hormonal levels, such as androgens, should also be measured before, during, and after pregnancy in order to determine whether differences between breastfeeders and bottle-feeders pre-dated pregnancy. In addition, efforts should be made to assess variables such as fatigue, mood, and depression more carefully in order to tease apart their influences from that of breastfeeding.

Statistical analyses should also control for such
influences as extent of breastfeeding, parity, and OCP use. When the extent of breastfeeding is not defined, it is difficult to assess the impact on sexual behaviour, since the breastfeeding group is heterogeneous (Alder, 1989).

Studies often group primiparous and multiparous women together, where previous breastfeeding experience may create expectations that bias the results. For example, multiparous women who breastfed with their last child may feel more comfortable with breast changes and leakage, and use of a nursing bra, all of which are factors which might deter a primiparous mother from engaging in sexual activity with her partner. In addition, primiparae have higher rates of episiotomy and dyspareunia (Barrett et al., 2000), the latter of which is often exacerbated by breastfeeding. The postpartum concerns of primiparous and multiparous women also differ. Dixon, Booth, and Powell (2000) found that primiparae complain equally of fatigue and lack of sexual desire, but for multiparous women, fatigue is much greater concern than lack of desire. Multiparae also experience less of an association between changes in the quality of the general relationship and changes in the quality of sex life than primiparae (Dixon et al., 2000), and tend to feel more secure about postpartum sexual activity (von Sydow, 1999). Other psychosocial differences related to parity emerge during pregnancy. Condon and Esuvaranathan (1990) found that first-time parents were less stressed and more attached to their unborn baby than second-timers, with the difference being greater in men than in women, probably because expectant parents with other children at home are experiencing more environmental stress. Primiparous and multiparous women also seem to differ from each other hormonally, as primiparae have been shown to have higher cortisol levels during pregnancy and in the early postpartum period (Bonnin, 1992).

The use of oral contraceptives is an important variable that influences the postpartum hormonal status, affecting free and protein-bound levels of estrogen, progesterone, and androgens, yet it is often not reported or documented. Ninety percent of postpartum women use contraception, mostly the pill or condoms (Glazener, 1997; von Sydow, 1999). While breastfeeding, many women who used combined OCPs prior to pregnancy then switch to progestosterone-only OCPs, and resume taking combined OCPs after weaning (Alder, 1989). Thus, progesterone levels in these breastfeeding women would be more similar to those of bottle-feeders than their non-OCP-using counterparts. However, bottle-feeders regain fertility sooner and are more likely to use OCPs than are breastfeeders (Alder & Bancroft, 1988), increasing both the estrogen and progesterone differences already present between bottle-feeders and breastfeeders. Further research is needed to evaluate the implications of these differences.

Directions for Future Research
In order to elucidate the subtleties of the fatigue-desire relationship and other possible confounds that potentially either decrease or increase the influence of breastfeeding on sexual functioning, key variables must be adequately measured. Resumption latency and frequency of sexual intercourse are expected to differ only slightly between breastfeeders and bottle-feeders, as many other factors influence these behaviours that do not affect sexual desire, such as a desire to please the partner or resume former patterns, and to maintain intimacy. For this reason, further research would benefit from a focus on personal measures that are unconfounded by partner desires and influence, such as desire and sexual activity operationalized as the frequency of not only sexual intercourse, but also sexual thoughts, fantasy, and masturbation. Since these measures are subjective, efforts must be made to reduce the probability of inaccuracies in self-reports, such as using diary methods that require subjects to complete desire and activity ratings daily, thus minimizing recall time.

Breastfeeders should continue to be compared to bottle-feeders matched on weeks postpartum, and statistical analyses should be performed to control for the effects of degree of breastfeeding, age, use of contraception, and parity. Recruiting subjects for a less sensitive topic than sex research, but that happens to include questions about sexuality, would also increase sample generalizability. If utilizing within-subjects designs within a longitudinal framework, pre-pregnancy measures should be taken as soon as possible, since subjects’ comparison of their postpartum sexual functioning with pre-pregnancy levels is subject to retrospective contamination (e.g.,
from mood-dependent memory). In an ideal world, subjects would be recruited even before pregnancy; however, this is immensely impractical from a methodological standpoint. As yet, the absolute degree to which hormonal levels, particularly androgens, differ between breastfeeding and bottle-feeders is not known. Future research using proper controls and hormonal assays could help provide an answer to this intriguing question.

**Practical Implications**

Breastfeeding has at times been viewed somewhat suspiciously as providing sensual stimulation for the mother, detracting from her need for "normal" sexual expression. Inasmuch as the elevated prolactin and oxytocin levels that accompany each sucking episode are likely to induce subjective sensations of sexual satiation and to decrease androgen secretion, this theory may turn out to be hormonally well-founded. This of course does not validate any implication that the breastfeeding mother's priorities are misplaced. It is also important to recognize the wide individual variability in postpartum sexual patterns, and to remember that breastfeeding mothers trail behind bottle-feeders on most measures of sexual functioning only slightly; both considerations attesting to the powerful psychosocial influences on sexual functioning, including personality, learning, and relationship variables.

The trend of breastfeeding's lower desire and higher rates of dyspareunia does not suggest that the typical sexual pattern of breastfeeding women merits therapeutic intervention; instead, these findings provide a framework whereby new mothers and their partners can be informed about what changes to anticipate, easing the task of accommodating them if they arise. The dissemination of information about the potential changes in postpartum sexual functioning would normalize the typical pattern and reduce catastrophizing reactions on the part of either partner, as the sexual relationship most often returns to prepregnancy levels by one year postpartum regardless of feeding method.

Knowledge of the typical pattern would also ease the task of identifying those women whose decline in sexual functioning has reached clinical levels, since postpartum problems can become protracted in the absence of early intervention (Avery et al., 2000). In addition, if either health care providers or the new mothers themselves believe that one is supposed to feel sexless after the birth of a child, sexual dysfunctions may go unassessed and patients may be denied useful psychological interventions. In extreme cases, it may be recommended that the mother discontinue long-term breastfeeding, although most cases of short-term shifts in the sexual relationship can be accommodated by adjustments in communication and finding alternative ways to express intimacy within the relationship. Postpartum sexual functioning is clearly an important topic for physicians, nurses and midwives to discuss with the couple about to experience childbirth.

**References**


