
Perinatal Experiences: The Association of Stress, Childbearing, Breastfeeding, and Early Mothering

Sharron S. Humenick, PhD, RN, LCCE, FAAN
Olivia S. Howell, MPH

SHARRON HUMENICK is chair of the Maternal-Child Nursing Department in the School of Nursing at Virginia Commonwealth University in Richmond, Virginia. She is also editor of the Journal of Perinatal Education, sponsored by Lamaze International. OLIVIA HOWELL is a health care quality analyst for the Virginia Department of Medical Assistance Services in Richmond, Virginia.

Abstract

The support of women and their families through child-birth, breastfeeding, and early parenting experiences are often treated as separate areas of maternity care. In fact, growing evidence, as cited in this article, links their intertwined impact on the health of mothers, infants, and their families.

Journal of Perinatal Education, 12(3), 16–41; child-birth support, breastfeeding support, early parenting support, stress.

Evidence

Because the available evidence supports a logically consistent pattern, it is useful as a basis for evidence-based practice. The evidence for the assertions listed below can be summarized as supporting the statement that important benefits for mother and infant can be gained by increasing society's efforts to:

1. Provide mothers throughout the perinatal year with health-promoting, stress-reducing, and high-quality support;
2. Assist mothers to actively participate in natural, empowering births; and
3. Link the promotion and support of breastfeeding and early parenting with the promotion and support of an optimal birth experience.

Practice Implications

In the absence of compelling contrary evidence, maternity care should be based on the premise that childbirth, stress, breastfeeding, and early mothering experiences are associated. Thus, maternity care should support mothers through these experiences in a coordinated manner.

Assertions and References

1. Prenatal social support is linked to positive birth outcomes, and prenatal stress/depression is linked to negative birth outcomes. Thus, comprehensive prenatal care must include attention to both prenatal support and stressors.

Brown, M. A. (1986). Social support, stress, and health: A comparison of expectant mothers and fathers. *Nursing Research, 35*, 72–76.

Summary: When good partner support was present, expectant fathers fared better with regard to their health. The mothers, however, had a better health status when they had a strong social support system of social networks. N = 313 expectant couples.

Chung, T., Lau, T., Yip, A., Chiu, H., & Lee, D. (2001). Antepartum depressive symptomology is associated with adverse obstetric and neonatal outcomes. *Psychosomatic Medicine, 63*(5), 830–834.

Summary: Depression in late pregnancy was associated with increased risk of epidural analgesia, operative deliveries (cesarean sections and instrumental vaginal births), and admission to the neonatal care unit. These effects remained significant even when controlled for potential confounders, such as antepartum complications. N = 959.

Collins, N., Dunkel-Schetter, C., Lobel, M., & Scrimshaw, S. (1993). Social support in pregnancy; psychosocial correlates of birth outcomes, and postpartum depression. *Journal of Personal Social Psychology, 6*(6), 1243–1258.

Summary: Women with higher quality support had babies with higher Apgar scores and experienced less postpartum depression. Also, women with larger networks had babies of higher birth weight. N = 129.

Copper R., Goldenberg, R., Das, A., Elder, N., Swain, M., Norman, G., Ramsey, R., Cotroneo, P., Collins, B., Johnson, F., Jones, P., & Meier, A. (1996). The preterm prediction study: Maternal stress is associated with spontaneous preterm birth at less than thirty-five weeks' gestation. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. *American Journal of Obstetric Gynecology, 175*(5), 1286–1292.

Summary: The objective was to determine whether elevated levels of ferritin (a stress marker) in the genital tract might be a potent marker to identify patients at risk for spontaneous preterm delivery. Elevated cervical ferritin levels at 22 to 24 weeks of gestation in asymptomatic women are associated with subsequent spontaneous preterm birth. N = 182.

Da Costa, D. (2000). A prospective study on the influence of stress, social support, and coping on birth outcomes and depressive symptomology during pregnancy and the postpartum. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 60*(8-B), 4213.

Summary: Women who experienced greater stress during pregnancy had a more difficult labor/delivery, even after controlling for parity. Women who reported less satisfaction with their social support in the second trimester gave birth to infants of lower birth weight. N = 80.

Dole, N. (2001). Psychosocial risks for preterm birth. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 62*(3-B), 1348.

Summary: In an examination of multiple psychosocial factors simultaneously, women with high levels of pregnancy-related anxiety and high negative-life-event impacts were at almost three times the risk of preterm birth compared to women with low anxiety and low perceived stress. N = 1,488.

Domian, E. (2001). Cultural practices and social support of pregnant women in a northern New Mexico community. *Journal of Nursing Scholarship, 33*(4), 331–336.

Summary: Results indicate that pregnancy outcomes may be positive because of a socialization process that helps pregnant Hispanic women and family members adapt and change to support the pregnancy. This mutual shaping creates roles for both mother and family members, defines the mother-child and family-child relationships, and facilitates a positive process through a supportive orientation. N = 20.

Feldman, P., Dunkel-Schetter, C., Sandman, C., & Wadhwa, P. (2000). Maternal social support predicts birth weight and fetal growth in human pregnancy. *Psychosomatic Medicine*, 62(5), 715–725.

Summary: Social support and other variables accounted for 31% of the variance in fetal growth. These findings suggested that prenatal social support is associated with infant birth weight through processes involving fetal growth rather than those involving timing of delivery. N = 247.

Kuo, S. (2000). The contribution of the preterm labor stress and family resiliency factors to pregnancy adjustment and adaptation in the preterm labor family. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 60(11-B), 5435.

Summary: Family hardiness was the strongest predictor for pregnancy adjustment. N = 131.

Lederman, R. (1995). Treatment strategies for anxiety, stress, and developmental conflict during reproduction. *Behavioral Medicine*, 21(3), 113–122.

Summary: In this article, the focus is on treatment strategies and considerations for policy formation pertaining to the care of women, children, and families during reproduction. The following topics are discussed: (1) cognitive and behavioral strategies for decreasing anxiety and promoting relaxation during gestation and parturition; (2) educational and other activities to prepare women for the childbirth event and alternatives to current practice; (3) methods of providing support and enhancing the mother's capacity for coping with events occurring during labor and delivery; and (4) current national and international programs and pilot projects that have effectively promoted health and adaptation to pregnancy and have reduced the occurrence of reproductive complications.

Lichtman, R. S. (1998). Psychosocial factors and pregnancy outcome. *Dissertation Abstracts International: Section B: the Sciences and Engineering*, 58(12-B), 6520.

Summary: In this exploratory analysis including life events, social support, and their interaction, a complex model emerged for the prediction of gestational age. In the model, social support adversely affected gestational age among women with high levels of negative life events. N = 260.

Liese, L., Snowden, L., & Ford, L. (1989). Partner status, social support, and psychological adjustment during pregnancy. *Family Relations: Journal of Applied Family and Child Studies*, 38(3), 311–316.

Summary: Pregnant women who are partnered, as compared to those who are not, show important differences in the nature and kind of social support that serve to reduce emotional disequilibrium. N = 157.

Lodgson, C., Burkener, J., & Usui, W. (2000). The link of social support and postpartum depressive symptoms in African-American women with low incomes. *Journal of Maternal-Child Nursing*, 25(5), 262–266.

Summary: A high incidence of depression and depressive symptoms was noted and found to be associated with inadequate social support coupled with the maternal perception of the importance of the missing support to the mother's well-being. N = 57.

Mazor, M., Chaim W., Hershkowitz, R., Levy, J., Lieberman, J., & Glezerman, M. (1994). Association between preterm birth and increased maternal plasma cortisol concentrations. *Obstetric Gynecology*, 84(4), 521–524.

Summary: The study objective was to measure the amniotic fluid (AF) and plasma concentrations of cortisol in women with preterm labor and intact membranes. Although maternal plasma cortisol concentrations were significantly higher in women with preterm birth, no similar changes were found in the AF. The rise in maternal plasma cortisol may be related to the stress mechanism of labor. N = 38.

Paarlberg, K., Vingerhoets, A., Passchier, J., Dekker, G., & Van Geijn, H. (1995). Psychosocial factors and pregnancy outcome: A review with emphasis on methodological issues. *Journal of Psychosomatic Research*, 39(5), 563–595.

Summary: This review focused on the research concerning the relation between psychosocial factors and pregnancy outcome. The following four outcome measures were dealt with: (1) birth weight, (2) preeclampsia, (3) preterm labor, and (4) intrapartum complications. The most consistent finding concerned the association between maternal exposure to taxing situations and preterm delivery.

Sandman, C., Wadhwa, P., Chicz-DeMet, A., Dunkel-Schetter, C., & Porto, M. (1997). Maternal stress, HPA activity, and

fetal/income outcome. *Annals of the New York Academy of Science*, 8(14), 266–275.

Summary: Maternal stress during the 28–30 weeks of gestation is associated with gestational age at birth and infant birth weight. Maternal stress during the third trimester was associated with increased maternal plasma levels of ACTH and cortisol. This finding is consistent with possible mechanisms whereby psychosocial stress influences birth outcome. CRH controls the timing of labor and delivery. Precocious elevation of CRH is related to the risk of preterm delivery. Maternal stress signal is transmitted (release of ACTH and cortisol) and, then, amplified by the placental release of CRH. This possibility has at least two consequences: (1) influencing the timing of delivery and (2) loss of protection of the pregnant women from the results of stress (i.e., release of ACTH and beta E). Beta E appears to influence fetal learning and perhaps the developing nervous system.

Schneider, M. L., Roughton, E. C., Koehler, A. J., & Lubach, G. R. (1999). Growth and development following prenatal stress exposure in primates: An examination of ontogenetic vulnerability. *Child Development*, 70(2), 263.

Summary: Results indicated that infants from the early gestation stress condition weighed less than infants from mothers stressed during mid-late gestation. Moreover, whereas both groups scored lower than controls on measures of attention and neuromotor maturity, early gestation stress was associated with more pronounced and more pervasive motor impairments than mid-late gestation stress. These results suggest sensitivity to prenatal stress effects peaks during early gestation and tapers off during mid-late gestation. N = 28.

Wadhwa, P., Sandman, C., Porto, M., Dunkel-Schetter, C., & Garite, T. (1993). The association between prenatal stress and infant birth weight and gestational age at birth: A prospective investigation. *American Journal of Obstetrics and Gynecology*, 169(4), 858–866.

Summary: Women with an increased level of stress were more likely to deliver a low-birth weight infant. Birth weight decreased by 55 grams for every unit of life event to stress. Stress during pregnancy also increased the risk of premature delivery. N = 260.

2. Relaxation skills are associated with decreased perinatal stress, decreased preterm births, decreased

pain, decreased use of pain medication in childbirth, and an increased rate of in vitro conception. Thus, perinatal care is more comprehensive when mothers achieve relaxation skills.

Cattani, P., Sina P., Picolboni, G., Dell'Angelo, M., & Zanarotti, R. (1991). Effect of autogenic respiratory training on labor pain. Use of the Vaona algometer. *Minerva Ginecologica*, 43(11), 525–528.

Summary: The results of the research confirmed that the respiratory autogenic training (RAT) method, applied during labor, thanks to the positive influence on neuromuscular relaxation and the psychological aspects of the women, induces a favourable modulation on the perception of pain.

DePunzio, C., Neri, E., Metelli, P., Bianchi, M., Venticinque, M., Ferdeghini, M., & Fioretti, P. (1994). The relationship between maternal relaxation and plasma beta-endorphin levels during parturition. The relationship between maternal relaxation and plasma beta-endorphin levels during parturition. *Journal of Psychosomatic Obstetrics and Gynecology*, 15(4), 205–210.

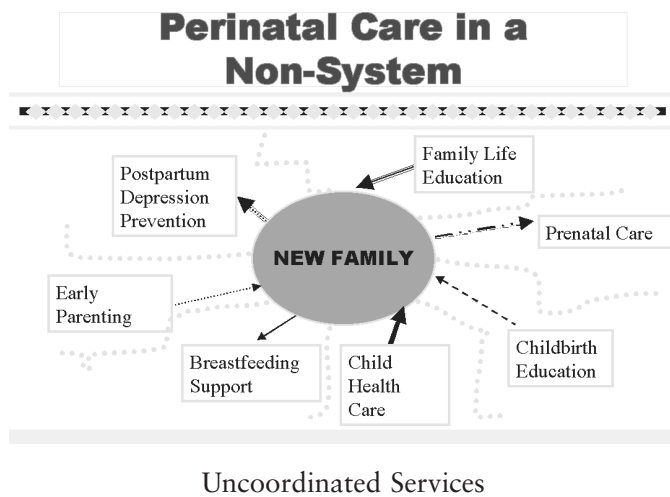
Summary: In conclusion, using the respiratory autogenic training (RAT) method favorably modulates the secretion of beta-EP during labor and at delivery. This result supports the effectiveness of the RAT method in reducing both maternal and fetal stress during labor. N = 28.

Eugster, A., & Vingerhoets, A. (1999). Psychological aspects of in vitro fertilization: A review. *Social Science and Medicine*, 48(5), 575–589.

Summary: Psychological factors such as ineffective coping strategies, anxiety, or depression are associated with a lower pregnancy rate following IVF-procedures. Support has been found suggesting that stress reduction through relaxation training or behavioral treatment improves conception rates.

Gonzalez, C. E. (1989). The music therapy-assisted childbirth program: A study evaluation. *Pre- and Peri-Natal Psychology Journal*, 4(2), 111–124.

Summary: The study revealed benefits of the program, including a reduction in anxiety during the reproductive cycle, a high level of satisfaction with the childbirth experience, and the ability to soothe the infant through prenatal music. N = 21.



Green, J. (1993). Expectations and experiences of pain in labor: Findings from a large prospective study. *Birth*, 20(2), 65–72.

Summary: In general, women tended to get what they expected. Breathing and relaxation exercises were widely used and were most successful for those who had expected them to be so. Anxiety about the pain of labor was a strong predictor of negative experiences during labor, lack of satisfaction with the birth, and poor emotional well-being, postnatally. N = 700.

Harmon, T., Hynan, M., & Tyre, T. (1990). Improved obstetric outcomes using hypnotic analgesia and skill mastery combined with childbirth education. *Journal of Consulting and Clinical Psychology*, 58(5), 525–530.

Summary: Both hypnotic subjects and highly susceptible subjects reported reduced pain. Hypnotically prepared births had shorter Stage 1 labors, less medication, higher Apgar scores, and more frequent spontaneous deliveries than control subjects' births. Highly susceptible, hypnotically treated women had lower depression scores after birth than women in the other three groups. Researchers proposed that repeated skill mastery facilitated the effectiveness of hypnosis in this study. N = 60.

Janke, J. (1999). The effect of relaxation therapy on preterm labor outcomes. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 28(3), 255–263.

Summary: Women who practiced relaxation had larger newborns, longer gestations, and higher rates of pregnancy prolongation. N = 107.

Jenkins, M., & Pritchard, M. (1993). Hypnosis: Practical applications and theoretical considerations in normal labour. *British Journal of Obstetric Gynecology*, 100(3), 221–226.

Summary: This study demonstrated the benefits of hypnotherapy, a form of deep relaxation. The study also provided some insight into the relative proportions of mechanical and psychological components involved in the longer duration of labor in primigravid women. N = 862.

Liebman, S. (1989). *The effects of music and relaxation on third trimester anxiety in adolescent pregnancy*. Unpublished doctoral dissertation, University of Miami, Florida.

Summary: This study examined the effects of a music and relaxation intervention on anxiety levels within a population of pregnant adolescents. Analysis revealed a significant difference between the two groups on the trait anxiety scores and a significant difference between the groups with regard to state anxiety (the treatment group exhibited less anxiety). N = 39.

Linden, W. (1994). Autogenic training: A narrative and quantitative review of clinical outcome. *Biofeedback Self-Regulation*, 19(3), 227–264.

Summary: Quantitative findings across studies suggested that autogenic relaxation training was associated with medium-sized pre- to post-treatment effects (.43 for biological indices and .58 for psychological and behavioral indices). These findings matched effect sizes for other biobehavioral treatment techniques, including biofeedback and muscular relaxation.

Martin, A., Schauble, P., Rai, S., & Curry, R. (2001). The effects of hypnosis on the labor processes and birth outcomes of pregnant adolescents. *Journal of Family Practice*, 50(5), 441–443.

Summary: Hypnosis is a form of deep relaxation. In this study, labor and delivery outcome measures were significantly different favoring the hypnosis intervention group in the number of complicated deliveries, surgical procedures, and length of hospital stay. N = 42.

Robison, C. P. (1999). Effects of a stress management intervention on levels of stress and coping among pregnant and parenting adolescents: An investigation (girls). *Dissertation Abstracts International, A (Humanities and Social Sciences)*, 60(5-A), 1464.

Summary: Respondents indicated that techniques of relaxation, breathing, and cognitive restructuring learned during the intervention were effective in coping with stress.

Rush, J., Burlock, S., Lambert, K., Loosley-Millman, M., Hutchinson, B., & Enkin, M. (1996). The effects of whirlpool baths in labor: A randomized, controlled trial. *Birth*, 23, 136-143.

Summary: The group of women using whirlpool bathing during labor demonstrated a statistically significant decrease in the need for analgesia during labor. The experimental group experienced fewer deliveries by use of forceps and vacuum. Labor for primiparous women was longer with whirlpool tub use. The mothers in the experimental group expressed overall satisfaction with the use of the whirlpool in combination with the added nursing support. N = 785.

Schauble, P., Werner, W., William, E., Rai, S., & Martin, A. (1998). Childbirth preparation through hypnosis: The hypnoreflexogenous protocol. *American Journal of Clinical Hypnosis*, 40(4), 273-283.

Summary: Applications of the method of hypnosis demonstrate patients have fewer complications, higher frequency of normal and full-term deliveries, and more positive postpartum adjustment.

Wiand, N. E. (1997). Relaxation levels achieved by Lamaze-trained pregnant women listening to music and ocean sound tapes. *The Journal of Perinatal Education*, 6(4), 1-8.

Summary: Each type of music/sound used had the same size effect, leading to increased relaxation. This was evidenced by measurement of all four biofeedback results. N = 36.

3. Preparing for childbirth is associated with taking a more active participatory role and feeling in control during childbirth. Those who felt in control during childbirth also report a more satisfying birth, less postpartum depression, and an increased motherhood identity.

Adams, M., Bruce, C., Shulman, H., Kendricks, J., Brogan, D., & The Prams Working Group. (1993). Pregnancy planning and preconception counseling. *Obstetric Gynecology*, 82, 955-959.

Summary: A high percentage of women could have profited from preconception education in regard to smoking, drinking, being underweight, and delaying prenatal care. Sixty percent of pregnancies were planned, and 38% of them had one or more indications for preconception counseling. The need for preconceptual counseling was higher among those with unintentional pregnancies (66%). N = 12,452.

Barghelame, M. (1995). *Prenatal class attendance, fatigue, self perception of agentic behavior in labor and delivery, and anxiety of postpartum women*. Unpublished master's thesis, University of Wyoming.

Summary: A discriminant analysis revealed significant relationships between state of anxiety at 3 weeks postpartum and self-perception of agentic behavior (active participation) in childbirth. Agentic behavior was noted to be higher for primiparous subjects taking prenatal classes than for those subjects who did not attend classes. N = 88.

Doering, S., Entwisle, D., & Coylan, C. (1980). Modeling the quality of women's birth experience. *Journal of Health and Social Behavior*, 21, 12-21.

Summary: A recursive model is proposed. It suggests that being able to remain in control is a major benefit conferred upon a woman by preparation, and that the social support afforded by the husband's presence at the birth contributes to the enhancement of the woman's birth experience. N = 120 couples.

Elliott, S., Leverton, T., Sanjack, M., Turner, H., Cowmeadow, P., Hopkins, J., & Bushnell, D. (2000). Promoting mental health after childbirth: A controlled trial of primary prevention of postnatal depression. *British Journal of Clinical Psychology*, 39(3), 223-241.

Summary: Findings suggest that some depressions following childbirth can be prevented by brief interventions that can be incorporated with existing systems of antenatal classes and postnatal support groups. N = 197.

Ethier, K. (1996). *Becoming a mother: Identity acquisition during the transition to parenthood*. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 56(10-B), 5832.

Summary: Active preparation for pregnancy was associated with identification of oneself as a mother and posi-

tive feelings about pregnancy and motherhood early in the transition.

Farley, C. L. (2000). Vicarious experience: A source of self-efficacy for birth. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 60(11-B), 5431.

Summary: Generalized childbirth expectations explained 25% of the variance in childbirth self-efficacy. Additionally, a woman's satisfaction with her birth experience and the attribution labor and birth performance to the woman's own efforts explained 23% of the variance in self-efficacy for a future labor and birth. N = 159.

Felton, G., & Segelman, F. (1978). Lamaze childbirth training and changes in belief about personal control. *Birth and the Family Journal*, 5, 141-149.

Summary: Results of the postdelivery test indicated that the Lamaze training led the women to see themselves, to a significantly greater degree, as the locus of control. N = 127.

Green, J., Coupland, V., & Kitzinger, J. (1990). Expectations, experiences, and psychological outcomes of childbirth: A prospective study of 825 women. *Birth*, 17, 15-24.

Summary: Four different indices of psychological outcome were considered: fulfillment, satisfaction, emotional well-being, and the words that women used to describe their babies. Results did not support popular stereotypes: High expectations were not found to be bad for women, although low expectations often were. Information and feeling in control were consistently associated with positive psychological outcomes. N = 825.

Hallgren, A., Kihlgren, M., Norberg, A., & Forslin, L. (1995). Women's perceptions of childbirth and childbirth education before and after education and birth. *Midwifery*, 11(3), 103-137.

Summary: The findings stress the importance of individual assessment of expectations of and experiences of childbirth education. Consistency in information given before and during childbirth supports a sense of comprehensibility, manageability, and meaningfulness. N = 11.

Johnston-Robledo, I. (1998). The impact of childbirth preparation and support on labor and birth outcomes. *Dissertation Abstracts International, A (Humanities and Social Sciences)*, 58(8-A), 3000.

Summary: Lower income women reported higher levels of pain during childbirth, were less likely to attend childbirth preparation classes, and more likely to acquire information about childbirth from their mothers than higher income women. Women who attended classes learned more about labor and delivery and used a wider variety of coping strategies than women who did not attend classes. N = 45.

Klusman, L. E. (1975). Reduction of pain in childbirth by the alleviation of anxiety during pregnancy. *Journal of Consulting and Clinical Psychology*, 43, 162-165.

Summary: Only the childbirth education course (Lamaze method) succeeded in reducing general anxiety level, as measured by the IPAT Anxiety Scale. Anxiety level was found to exert a significant effect on self-ratings of pain during the transition stage of labor. The researchers concluded that childbirth education can reduce fear and anxiety and that pain perception is enhanced by high anxiety. N = 42.

Knapp, L. (1996). Childbirth satisfaction: The effects of internality and perceived control. *Journal of Perinatal Education*, 5(4), 7-16.

Summary: A significant positive correlation between perceived control and childbirth satisfaction was found, but not between internality and childbirth satisfaction. Perceived control explained the greatest amount of variance in childbirth satisfaction.

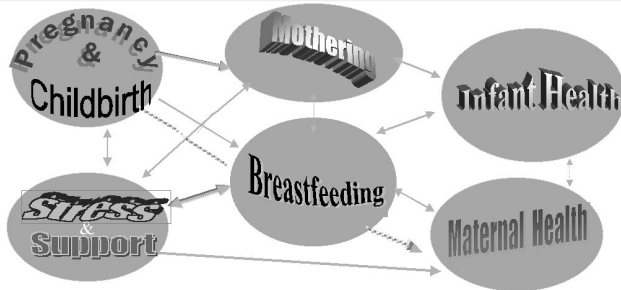
Larsen, K. E., O'Hara, M. W., Brewer, K. K., & Wenzel, A. (2001). A prospective study of self-efficacy expectancies and labour pain. *Journal of Reproductive and Infant Psychology*, 19(3), 203-214.

Summary: Self-efficacy expectancies for the early and active phases of the first stage of labor predicted approximately 20% of the variance in pain levels for these phases, respectively. N = 37.

Mackey, M. C. (1990). Women's preparation for the childbirth experience. *Maternal-Child Nursing Journal*, 19(2), 143-173.

Summary: The majority of subjects reported that being informed about labor and delivery was generally helpful because it decreased fear, which increased relaxation, decreased tension, and increased the chance of managing labor well. N = 61.

Perinatal Associations



Mercer, R. T. (1985). Relationship of the birth experience to later mother behaviors. *Journal of Nurse-Midwifery*, 30, 204-211.

Summary: The perception of the birth experience had a significantly positive relationship with later maternal behaviors among the teenage group at all test periods and among the 20-year-old group at all test periods, except the 8-month test period. The 30- to 42-year-old mothers' maternal behaviors were not related to their perceptions of the birth experience.

Pridham, K., Lytton, D., Chang, A., & Rutledge, D. (1991). Early postpartum transition: Progress in maternal identity and role attainment. *Research in Nursing and Health*, 14, 21-32.

Summary: Sets of early postpartum transition variables and relationships among them examined in this study were: (1) maternal attributes, (2) infant feeding plan, (3) birthing conditions, (4) birthing experience, and (5) transition. The direct contribution of preparation for birthing to both parenting evaluation and infant- and self-care capabilities and of supports and usefulness of postpartum resources to self-care capability merits clinical attention to these variables.

Salmon, P., & Drew, N. (1992). Multidimensional assessment of women's experience of childbirth: Relationship to obstetric procedure, antenatal preparation, and obstetric history. *Journal of Psychosomatic Research*, 36(4), 317-327.

Summary: Delivery was less distressing in those who attended antenatal classes. N = 110.

Slade, P., Escott, D., Spiby, H., Henderson, B., & Fraser, R. (2000). Antenatal predictors and use of coping strategies in labour. *Psychology and Health*, 15(4), 555-569.

Summary: Among the participants, 88% used the breathing method during labor, 51% used posture methods, and 48% used relaxation. Intention to use coping strategies was a significant predictor of their actual use. N = 121.

Slade, P., Macpherson, S., Hume, A., & Maresh, M. (1993). Expectations, experiences, and satisfaction with labour. *British Journal of Clinical Psychology*, 32(Pt. 4), 469-483.

Summary: Personal satisfaction (i.e., satisfaction with self) in labor was strongly associated with the ability to control panic and other aspects of personal control. The ability to control panic was mainly influenced by the use of exercises. N = 81.

Willmuth, L., (1975). Prepared childbirth and the concept of control. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 7(33), 38-41.

Summary: Findings suggest that the perception of maintaining control was closely associated with childbirth satisfaction. In this study, control was defined as the women's ability to influence meaningful decisions related to care. N = 1,145.

4. Using coping techniques, receiving emotional support, and feeling secure with caregivers are factors associated with a more satisfying birth experience and subsequent measures of well-being.

Beck, S. (1987). *Relationships among perceived risks, control, and satisfaction in two birth settings*. Unpublished doctoral dissertation, University of Texas, Austin, Texas.

Summary: Satisfaction with childbirth was significantly correlated with perceptions of self-control during labor ($p = .001$) and sex of the baby ($p = .0002$). The home group had significantly greater expectations for self-control ($p = .005$) and environmental control ($p = .001$), and perceived significantly less risk ($p = .002$) in home birth than the hospital group. N = 60.

Berkowitz, G., Scott, K., & Klaus, M. (1999). A comparison of intermittent and continuous support during labor: A meta-analysis. *American Journal of Obstetrics and Gynecology*, 180(5), 1054-1059.

Summary: When compared to no doula support, continuous support was significantly associated with shorter labors with a decreased use of analgesia, oxytocin, forceps, and cesarean births. Intermittent doula support was not significantly associated with any of the positive outcomes. N = 11 studies reviewed.

Bryanton, J., Fraser-Davey, H., & Sullivan, P. (1994). Women's perceptions of nursing support during labor. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 23(8), 638-644.

Summary: Nurses can assist women to cope with the stress of labor. They must use a high degree of interpersonal skills in the care of laboring women in addition to being technically competent. N = 80.

Ecklund-Fitzhum, R. (1986). *The correlations between woman's perceived control during childbirth and subsequent satisfaction with the experience*. Unpublished master's thesis, Oregon Health Sciences University, Portland.

Summary: A woman's perception that she was in control during her labor and delivery correlated significantly with her total satisfaction. The analysis of the relationships between control, satisfaction, and other potentially intervening determinants revealed a clustering of variables. The profile of a woman who had perceived control during labor and delivery and who expressed satisfaction with the experience was one who had experienced an unmedicated, fast, less painful spontaneous vaginal birth with immediate infant contact. The correlation between control and satisfaction was weakened when a woman had an assisted vaginal childbirth. N = 134.

Kannan, S., Jamison, R. N., & Datta, S. (2001). Maternal satisfaction and pain control in women electing natural childbirth. *Anesthesia and Pain Medications*, 26(5), 468-472.

Summary: In this study, 88% of women who requested an epidural for pain reported being less satisfied with their childbirth experience than those who did not, despite lower pain intensity. Pain relief alone was not found to improve maternal satisfaction. N = 47.

Manning-Orenstein, G. (1997). A birth intervention: Comparing the influence of doula assistance at birth versus Lamaze birth preparation on first-time mothers' working models of caregiving. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 58(5-B), 2689.

Summary: Security of caregiving during childbirth was positively associated with less mood disturbance during the postbirth period and higher self-esteem. The doula's support of the mother's competence during birth provides her with an experience of confidence in care that has a positive influence on the mother's postpartum views about caring for her child, her emotional state, and her self-esteem.

5. Satisfaction in childbirth is associated with less postpartum anxiety and depression. Thus, childbirth satisfaction is an important outcome.

Arizmendi, T., & Affonso, D. (1987). Stressful events related to pregnancy and postpartum. *Journal of Psychosomatic Research*, 31(6), 743-756.

Summary: The most intense stressors common to all groups were concerns regarding the baby's welfare, labor and delivery, and issues related to their mate/spouse. One unexpected pattern was the continued stress due to thoughts of labor and delivery among postpartum women. N = 221.

Ayers, S., & Pickering, A. (2001). Do women get post-traumatic stress disorder as a result of childbirth? A prospective study of incidence. *Birth-Issues in Perinatal Care*, 28(2), 111-118.

Summary: At least 1.5% of women may develop chronic PTSD as a result of childbirth.

Deluca, R. (1999). Diminished control and unmet expectations: Testing a theory of adjustment to cesarean delivery (childbirth satisfaction). *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 60(6-B), 3015.

Summary: Diminished control in childbirth was associated with an increase in postpartum depressed mood and a decrease in postpartum self-esteem, regardless of delivery type. N = 164.

Marshall, M. (1995). Women's psychological adjustment to the first experience of childbirth. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 55(8-B), 3568.

Summary: In relation to locus of control, the more internal mothers were satisfied with their childbirth experience and revealed less of an increase in depressive symptoms. Age was negatively related to self-esteem.

Income was positively related to the level of depressive symptoms. N = 56.

Neter, E., Collins, N., Lobel, M., & Dunkel-Schetter, C. (1995). Psychosocial predictors of postpartum depressed mood in socioeconomically disadvantaged women. *Women's Health, 1*(1), 51–75.

Summary: Results indicated that women who were more satisfied with the prenatal social support they received were less likely to experience postpartum depressed mood. Women who experienced more distressing life events during pregnancy and who reported higher levels of prenatal anxiety were more likely to feel depressed, after controlling for all other factors in the model. Finally, women who were more satisfied with their labor and delivery experience tended to be less depressed in the early months following childbirth. N = 108.

Reynolds, J. (1997). Post-traumatic stress disorder after childbirth: The phenomenon of traumatic birth. *Canadian Medical Association Journal, 156*(6), 831–835.

Summary: The author asserts that post-traumatic stress disorder (PTSD) may occur after childbirth. He calls this variant of PTSD a “traumatic birth experience.” There are many ways that health care professionals—including physicians, obstetric nurses, midwives, psychologists, psychiatrists, and social workers—can address this phenomenon. These include taking a careful history to determine whether or not a woman has experienced trauma that could place her at risk for a traumatic birth experience; providing excellent pain control during childbirth and careful postpartum care that includes understanding the woman’s birth experience; and ruling out postpartum depression.

Scott-Heyes, G. (1982). The subjective anticipation and evaluation of childbirth and anxiety. *British Journal of Medical Psychology, 55*(Pt.1) 53–55.

Summary: Anticipated and actual evaluations of childbirth were significantly correlated. Prenatal anxiety was not related to the actual experience, but actual evaluation was related to satisfaction and anxiety after the birth. N = 59.

6. Preparation for and perceived active participation in birth are associated with lower postpartum anxiety and related positive outcomes.

Humenick, S., & Bugen, L. (1981). Mastery: The key to childbirth satisfaction? A study. *Birth, 9*, 83–91.

Summary: In a comparison of prenatal to postnatal scores on the scale of the Personal Attributes Questionnaire measuring instrumentality, group mean increased significantly in the postnatal measure. These gain scores were found to correlate significantly with women’s perceived mastery behavior during childbirth, thus indicating support of a model in which mastery is described as the key to childbirth satisfaction. N = 37.

Littlefield, V., Chang, A., & Adams, B. (1990). Participation in alternative care: Relationship to anxiety, depression and hostility. *Research in Nursing and Health, 13*, 17–25.

Summary: Women who were more satisfied with care and their participation in care, regardless of whether they had an alternative or a conventional perinatal experience, reported less anxiety and depression immediately postdelivery. In four weeks, satisfaction and participation in care were still negatively related to anxiety. N = 99.

Markman, H., & Kadushin, F. (1986). Preventive effects of Lamaze training for first-time parents: A short-term, longitudinal study. *Journal of Consulting and Clinical Psychology, 54*, 872–874.

Summary: Results indicate that the Lamaze group reported approximately the same levels of marital satisfaction, state anxiety, and birth-related problems, whereas the non-Lamaze couples showed sharp decreases in marital satisfaction and increases in anxiety and postbirth problems. N = 76.

Simkin, P. (1991). Just another day in a woman’s life? Women’s long-term perceptions of their first birth experience. Part 1. *Birth, 18*(4), 203–210.

Summary: Women reported that their memories were vivid and deeply felt. Those with the highest long-term satisfaction ratings thought that they accomplished something important, that they were in control, and that the birth experience contributed to their self-confidence and self-esteem. They had positive memories of their doctors’ and nurses’ words and actions. N = 20.

7. Birth experience is associated with postpartum measures of stress, anxiety or depression, and/or attitudes towards breastfeeding.

Annie, C., & Groer, M. (1991). Childbirth stress: An immunological study. *Obstetrical Gynecology in Neonatal Nursing*, 20(5), 391–397.

Summary: The study examined salivary immunoglobulin A (IgA; a marker of stress) concentrations during pregnancy and at parturition. A significant drop in salivary IgA ($p < 0.001$) occurred at parturition. Mothers who had very low or undetectable IgA concentrations when they gave birth had increased incidences of postpartum complications, and their infants had more illnesses during the first six weeks postpartum.

DiMatteo, M. R., Morton, S. C., Lepper, H. S., Damush, T. M., Carney, M. F., Pearson, M., & Kahn, K. L. (1996). Cesarean childbirth and psychological outcomes: A meta-analysis. *Health Psychology*, 15(4), 303–314.

Summary: Findings across studies suggested that cesarean mothers, compared to mothers who delivered vaginally, expressed less immediate and long-term satisfaction with the birth and were less likely to breastfeed. They also experienced a much longer time to first interaction with their infants, had fewer positive reactions to them after birth, and interacted less with them at home.

Fisher, J., Astbury, J., & Smith, A. (1997). Adverse psychological impact of operative obstetric interventions: A prospective longitudinal study. *Australia and New Zealand Journal of Psychiatry*, 31(5), 728–738.

Summary: The findings of this study suggested that operative intervention in first childbirth carried significant psychological risks rendering those who experienced these procedures vulnerable to a grief reaction or to post-traumatic distress and depression. $N = 272$.

Rautava, P., Helenius, H., & Lehtonen, L. (1993). Psychosocial predisposing factors for infantile colic. *British Medical Journal*, 307(6904), 600–604.

Summary: Experience of stress and physical symptoms during the pregnancy, dissatisfaction with the sexual relationship, and negative experiences during childbirth were associated with the development of colic in the baby. $N = 2,850$.

8. Labor pharmacological agents have been shown to be associated with subsequent neonatal characteristics.

Brackbil, Y., Kane, J., Manniello, R., & Abramson, D. (1974). Obstetric meperidine usage and assessment of neonatal status. *Anesthesiology*, 40, 116–120.

Summary: Results were obtained using infant behavior measures (ENNS and BNBAS) of infants whose mothers received meperidine in labor. The potential for infants to be affected by medications administered to the mother during labor appeared clear.

Golub, M. (1996). Labor analgesia and infant brain development. *Pharmacology, Biochemistry and Behavior*, 55(4), 619–628.

Summary: A review of a series of studies was completed using a rhesus monkey model for administration of labor analgesia under controlled experimental conditions and long-term behavioral evaluation of infants. Most of the assessments, including those of cognitive function, were not influenced by perinatal analgesia. However, these studies confirmed the neonatal depressant effects of meperidine (MP) and suggested that the course of behavioral maturation during certain periods of infancy is influenced by both MP and bupivacaine (BU) epidural administration at birth. These effects could occur as a result of effects on vulnerable brain processes during a sensitive period, interference with programming of brain development by endogenous agents, or alteration in early experiences. Review.

Hodgkinson, R., & Husain, R. (1982). The duration effect of maternally administered meperidine on neonatal neurobehavior. *Anesthesiology*, 56, 51–52.

Summary: Significant differences were reported in performance for the infant group given meperidine during the first three days. The pharmacologic effects of meperidine were limited to the first three days of life. $N = 50$.

Klein, M. C., Grzybowski, S., Harris, S., Liston, R., Spence, A., Le, G., Brummendorf, D., Kim, S., & Kaczorowski, J. (2001). Epidural analgesia use as a marker for physician approach to birth: Implications for maternal and newborn outcomes. *Birth*, 28(4), 243–248.

Summary: Patients of family physicians with low, medium, and high epidural rates were compared. After adjustment for maternal age and race, patients of low-epidural-use physicians sustained fewer fetal malpositions and had fewer cesarean births, less obstetric consultation, and fewer newborn special-care admissions. The

authors concluded that, in their setting, a style of practice on the part of physicians led to dysfunctional labors and higher intervention rates leading, in turn, to excess maternal/newborn morbidity.

Kuhnert, B., Linn, P., Kennard, M., & Kuhnert, P. (1985). Effects of low doses of meperidine on neonatal behavior. *Anesthesia and Analgesia*, 64, 335–342.

Summary: Correlation techniques were used to examine relationships between the Brazelton Neonatal Behavioral Assessment Scale (BNBAS) performance and clinical and pharmacological variables related to drug administration. The BNBAS cluster scores representing regulation of state and number of abnormal reflexes were significantly different in study neonates from control neonates. Performance depended upon test day. N = 57.

Macaulay, J. H., Bond, K., & Steer, P. J. (1992). Epidural analgesia in labor and fetal hyperthermia. *Obstetrics and Gynecology*, 80, 665–668.

Summary: Epidural analgesia resulted in a significant fetal temperature rise compared to other methods of analgesia. Duration of epidural analgesia correlated with the fetal temperature ($R = 0.44$, $P = .012$). In this study, researchers estimated that 5% of fetuses reached a core temperature in excess of 40°C, all in association with epidural analgesia. They suggested that antipyretic measures be considered after 5 hours of epidural analgesia in ambient temperatures above 24°C. N = 57.

Scanlon, J., (1981). Effects of obstetric anesthesia and analgesia on the newborn: A select, annotated bibliography for the clinician. *Clinical Obstetric Gynecology*, 24, 649–670.

Summary: Numerous studies have been done to determine the effect of anesthetic agents on the baby. Findings indicated that lidocaine compromised neonatal neurobehavioral function. The infants were described as “floppy, but alert.” Bupivacaine was shown to produce depressed motor performance, particularly in infants at one day of age. Those babies whose mothers were given oxytocin as well seemed to have greater depression. In another study, infants born after epidural bupivacaine were shown to have adverse effects on motor organization, ability to control their state of consciousness, and physiological response to stress. These effects were found up to six weeks postpartum. Immediately after birth, those infants with the most exposure to bupivacaine were more likely to be cyanotic with decreased alertness.

9. Labor narcotics have been shown to impact early suckling or breastfeeding.

Brazelton, T. (1961) Effect of maternal medication on the neonate and his behavior. *Journal of Pediatrics*, 58, 13–18.

Summary: Findings suggested that an unusual period of general disorganization, lasting 3–4 days, existed in infants whose mothers were heavily medicated. A higher percentage of successful breastfeeding was noted in the less-medicated group compared to the heavily medicated group, up to Day Four ($P = 0.001$). N = 41.

Crowell, M., Hill, P., & Humenick, S. (1994). Relationship between obstetric analgesia and time of effective breastfeeding. *Journal of Nurse-Midwifery*, 39(3), 150–156.

Summary: Labor analgesia significantly affected mother-rated Infant Breastfeeding Attrition (IBFAT) scores when initiation time was considered. Infants whose mothers received analgesia within one hour of birth, or no analgesia, and who initiated breastfeeding early established effective feeding significantly earlier than infants with longer duration of analgesia exposure and later initiation of breastfeeding. N = 48.

Giesinger, C., & Halpern, S. (1996). Epidurals and breastfeeding. *Birth*, 23(4), 244–245.

Summary: Findings suggested that married mothers were more likely than single mothers to be breastfeeding at six months. Additionally, mothers who received epidurals were less likely to be breastfeeding at six months than mothers who did not receive epidurals.

Kron, R., Stein, M., & Goddard, K. (1966). Newborn sucking behavior affected by OB sedation. *Pediatrics*, 37, 1012–1016.

Summary: Researchers found that sucking behavior has a direct effect on breastfeeding experience. Nutritive sucking in the newborn, specifically the rate of sucking, was significantly influenced by the central nervous system depressant (secobarbital) given to the mothers. N = 20.

Matthews, M. (1989). The relationship between maternal labor analgesia and delay in the initiation of breastfeeding in healthy neonates in the early neonatal period. *Midwifery*, 5, 3–10.

Summary: Findings suggested that even small doses of the narcotic analgesic alphaprodine, when administered 1–3 hours prior to delivery, can delay effective feeding by several hours and, in some cases, days. N = 38.

Ransjoe-Arvidson, A., Matthiesen, A., Lilja, G., Nissen, E., Widstrom, A., & Uvnaes-Moberg, K. (2001). Maternal analgesia during labor disturbs newborn behavior: Effects on breastfeeding, temperature, and crying. *Birth—Issues in Perinatal Care*, 28(1), 5–12.

Summary: The infants of mothers receiving labor analgesia had higher temperatures and cried more than infants whose mothers had not received any analgesia. They were also less likely to breastfeed within the first 2.5 hours of life. N = 28.

Righard, L., & Alade, M. (1990). Effect of delivery room routines on success of first breastfeed. *Lancet*, 336, 1105–1107.

Summary: Use of drugs such as pethidine negatively impacted breastfeeding initiation. When contact between mother and infant was uninterrupted during the first hour after birth, infants were more likely to suck correctly. N = 72.

Riordan, J., Gross, A., Angeron, J., Krumwiede, B., & Melin, J. (2000). The effect of labor pain relief medication on neonatal suckling and breastfeeding duration. *Journal of Human Lactation*, 16(1), 7–12.

Summary: Researchers examined the relationship of labor pain relief medications with neonatal suckling and breastfeeding duration in 129 mothers delivering vaginally. Controlling for infant age, birth weight, and gender, infants of unmedicated mothers had higher suckling scores. Thus, labor pain relief medications were shown to diminish early suckling but were not demonstrated to make a difference in breastfeeding duration through 6 weeks postpartum.

10. Labor epidurals are associated with the mother's health, including surgery, headaches, backaches, and costs.

Butler, R., & Fuller, J. (1998). Back pain following epidural anaesthesia in labour. *Canadian Journal Anaesthesia*, 45(8), 724–728.

Summary: A prospective study. Conclusion: Back pain following epidural anaesthesia is common, but persistent

back pain is much less common. A previous history of back pain increases the likelihood of postpartum back pain following epidural anaesthesia. Nulliparity is associated with a decreased risk. N = 270.

Eakes, M. (1990). Economic considerations for epidural anaesthesia in childbirth. *Nursing Economics*, 8, 329–332.

Summary: Significant relationships with epidural use were found with four outcomes: increased use of forceps or vacuum extractor, increased length of second-stage labor, increased incidence of cesarean birth, and increased need for oxytocin augmentation. These findings have significant implications for staffing on labor units and costs. N = 140.

Fusi, L., Steer, P. J., Maresh, M. J., & Beard, R. W. (1989). Maternal pyrexia associated with the use of epidural analgesia in labour. *Lancet*, 1(8649), 1250–1253.

Summary: Patients receiving epidural analgesia during labor were at increased risk of developing pyrexia when compared to those receiving pethidine. This pyrexia might be the result of vascular and thermoregulatory modifications induced by epidural analgesia. N = 40.

MacArthur, C., Lewis, M., & Knox, E. G. (1992). Investigation of long-term problems after obstetric epidural anaesthesia. *British Medical Journal*, 304, 1278–1282.

Summary: Associations with epidurals and backache, headache, and weakness require randomised trials to determine the extent to which a causal relation exists. Symptoms are often reported as being new and persisting for more than one year. N = 11,701.

Thorp, J. A., Hu, D., Albin, R., McNitt, J., Meyer, B., Cohen, G., & Yeast, J. (1993). The effect of intrapartum epidural analgesia on nulliparous labor: A randomized, controlled, prospective trial. *American Journal of Obstetrics and Gynecology*, 169, 851–859.

Summary: In a randomized, controlled, prospective trial, epidural analgesia resulted in a significant prolongation in the first and second stages of labor. Additionally, a significant increase occurred in the frequency of cesarean delivery, primarily related to dystocia. N = 98.

Thorp, J., & Breedlove, G. (1996). Epidural analgesia in labor: An evaluation of risks and benefits. *Birth*, 23(2), 62–83.

Summary: Epidural analgesia is a safe and effective method of relieving pain in labor; however, it is associ-

ated with longer labor, more operative intervention, and increases in cost. Women should be counseled about these risks and other pain-relieving options before the duress of labor. Review of 102 articles.

Thorp, J., Eckert, L., Ang, M., Johnston, D., Peaceman, A., & Parisi, V. (1991). Epidural analgesia and cesarean section for dystocia: Risk factors in nulliparas. *American Journal of Perinatology*, 8, 402–410.

Summary: This study found that epidural analgesia in labor was associated with an increase in the incidence of cesarean section for dystocia in nulliparas. N=500.

11. Labor epidurals have been associated with a “fussy” baby in the early weeks of its life. (Fussy babies may be perceived as being inadequately fed.)

Murray, A., Dolby, R., Nation, R., & Thomas, D. (1981). Effects of epidural anesthesia on newborns and their mothers. *Child Development*, 52, 71–81.

Summary: Effects of drugs on the neonatal behavior were strongest on the first day. By the fifth day, evidence of behavioral recovery emerged, but the medicated babies continued to exhibit poor state organization. At 1 month of age, examiners observed few differences between groups; however, unmedicated mothers reported their babies to be more sociable, rewarding, and easy to care for, and these mothers were more responsive to their babies’ cries. N=55.

Ransjo-Arvidson, A. B., Matthiesen, A. S., Lilja, G., Nissen, E., Widstrom, A. M., & Uvnas-Moberg, K. (2001). Maternal analgesia during labor disturbs newborn behavior: Effects

on breastfeeding, temperature, and crying. *Birth*, 28(1), 5–12.

Summary: After birth, infants whose mothers had received no labor analgesia made more finger and hand movements when put to breast, made significantly more hand-to-mouth movements, touched the nipple more with their hands before sucking, made more licking movements, and more often successfully sucked the breast. Infants whose mothers received analgesia had higher temperatures and cried more. Analysis was blinded and from videotapes. N=28.

Rosenblatt, D., Besley, E., Lieberman, B., Redshaw, M., Caldwell, J., Notarianni, L., Smith, R., & Beard, R. (1981). The influence of maternal analgesia on neonatal behavior. II. Epidural bupivacaine. *British Journal of Obstetrics and Gynaecology*, 88, 407–413.

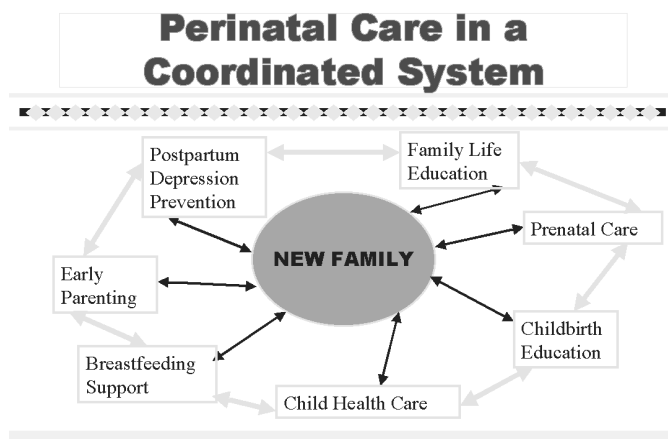
Summary: Immediately after delivery, infants with greater exposure to bupivacaine in utero were more likely to be cyanotic and unresponsive to their surroundings. Visual skills and alertness decreased significantly with increases in the cord blood concentration of bupivacaine, particularly on the first day of life but also throughout the next six weeks. Adverse effects of bupivacaine levels on the infant’s motor organization, his ability to control his own state of consciousness, and his physiological response to stress were also observed (i.e., fussiness).

Sepkoski, C., Lester B., Ostheimer, G., & Brazelton, T. (1992). The effects of maternal epidural anesthesia on neonatal behavior during the first month. *Developmental Medicine and Child Neurology*, 34(12), 1072–1080.

Summary: Epidural mothers had longer labors, more forceps deliveries, and a greater amount of oxytocin. They also reported spending less time with their infants while in the hospital. Controlling for these medical variables, a dose effect was found for orientation and motor scores. This paper also discusses possible effects of the infant’s early disorganization (i.e., fussiness) on the mother-infant interaction. N=40.

12. Perceived insufficient milk supply and the subsequent use of supplementation and complementation with manufactured baby milks lead to early weaning.

Batrouni, L., Sabulsky, J., Reyna, S., & Quiroga, D. (1996). Breastfeeding during the first month of life in Cordoba City,



Argentina. *Archivos Latinoamericanos de Nutricion*, 46(1), 16–21.

Summary: The average age in which formula was introduced was 3.7 days. The main reasons were “insufficient mother milk” and “the child’s hunger.” The health personnel helped support the introduction of lacteal formula in 68% of the children with partial lactation and in 42% of the cases of complete abandonment of natural breastfeeding. N = 620.

Kulsoom, U., & Saeed, A. (1997). Breastfeeding practices and beliefs about weaning among mothers of infants aged 0–12 months. *Journal of the Pakistani Medical Association*, 47(2), 54–60.

Summary: The most common reason for starting bottlefeeding was perceived “insufficiency” of breast milk (71%). Working women reported problems in feeding their children exclusively on breast during early infancy. N = 52.

Loughlin, H., Clapp-Channing, N., Gehlbach, S., Pollard, J., & McCutchen, T. (1985). Early termination of breastfeeding: Identifying those at risk. *Pediatrics*, 75(3), 508–513.

Summary: Supplementing with formula before the 2-week office visit led to termination of breastfeeding by 8 weeks ($P = .006$). Nearly 64% (14/22) of the mothers who added formula within the first 2 weeks did so without contacting the pediatric practice. N = 94.

13. Use of manufactured baby milks is associated with earlier weaning.

Alikasifoglu, M., Erginoz, E., Gur, E., Baltas, Z., Beker, B., & Arvas, A. (2001). Factors influencing the duration of exclusive breastfeeding in a group of Turkish women. *Journal of Human Lactation*, 17(3), 220–226.

Summary: The median age for starting non-breast-milk liquids was 1 month for those who received formula in the hospital and 3 months for those who did not ($P = 0.001$). The hospital practices were more predictive of the duration of exclusive breastfeeding in this study group than mothers’ knowledge of infant feeding or psychological factors. Thus, hospital practices should be re-evaluated. N = 91.

Barria, M., Orozco, B., Gatica, M., Makenney, J., Valverde, C., Drago, M., & Valenca, C. (1990). Early introduction of

dairy formulas in infant feeding. *Revista Chilena Pediatría*, 61(4), 218–222.

Summary: Early introduction of formula negatively influenced duration of breastfeeding, which attained a median length of 3 months in partially artificially-fed infants versus 10 months in those exclusively breastfed. N = 365.

Bevan, M., Mosley, D., & Solimano, G. (1984). Factors influencing breastfeeding in an urban WIC Program. *Journal of the American Dietitians Association*, 84, 563–567.

Summary: Increased duration of breastfeeding was significantly associated with the father’s support of breastfeeding, receipt of breastfeeding information, and the delayed introduction and infrequent use of breast-milk substitutes.

Chezem, J., Friesen, C., Montgomery, P., Fortman, T., & Clark, H. (1998). Lactation duration: Influences of human milk replacements and formula samples on women planning postpartum employment. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 27(6), 646–651.

Summary: Receipt of formula samples by mail was associated with reduced incidence of breastfeeding at 6 weeks and shortened duration of lactation. N = 53.

Coreil, J., & Murphy, J. (1988). Maternal commitment, lactation practices, and breastfeeding duration. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 17, 273–278.

Summary: The strongest predictor of duration was prenatal intent. However, formula supplementation had an independent negative effect and was inversely related to social support. N = 44.

Feinstein, J., Berkelhamer, J., Gruszka, M., et al. (1986). Factors related to early termination of breastfeeding in an urban population. *Pediatrics*, 73, 210–215.

Summary: Factors correlating significantly with improved breastfeeding rates included maternal age, maternal education, nonsmoking, previous breastfeeding, planned pregnancy, initiation of breastfeeding in the first 16 hours, and minimization of formula supplementation in the nursery. Partial breastfeeding (supplementing more than one bottle of formula per day, measured at 1 month postpartum) was associated with shorter breastfeeding duration. This latter effect was minimized by frequent nursing (seven or more times per day), despite formula supplementation. N = 166.

Gray-Donald, D., Kramer, M., Munday, S., & Leduc, D. (1985). Effect of formula supplementation in the hospital on the duration of breastfeeding: A controlled clinical trial. *Pediatrics*, *75*, 514–518.

Summary: Infants still breastfeeding at 4–9 weeks were more likely to have been unsupplemented, but hospital supplementation did not show this difference. N = 621.

Hill, P. (1991). Predictors of breastfeeding duration among WIC and non-WIC mothers. *Public Health Nursing*, *8*, 46–52.

Summary: Findings suggested that a number of variables could be used to identify those at risk for unsuccessful or curtailed breastfeeding, with introduction of formula being the most detrimental. N = 400.

Hill, P., Humenick, S., Brennan, M., & Woolley, D. (1997). Does early supplementation affect long-term breastfeeding? *Clinical Pediatrics*, *36*(6), 345–350.

Summary: Early introduction of supplemental bottles of artificial milks was significantly associated with early weaning. N = 343.

Kurini, N., Shiono, P., & Rhoads, G. (1988). Breastfeeding incidence and duration in black and white women. *Pediatrics*, *81*(3), 365–371.

Summary: Breastfeeding rates were 84% among white and 49% among black women. Maternal educational level was strongly associated with breastfeeding, whereas the effect of ethnicity was moderate. The high rate of formula supplementation among black women and its strong association with shortened duration of breastfeeding pointed to a need for more advice and support and less reliance on formula during the hospital stay. N = 1,179.

Marandi, A., Afzali, H., & Houssaini, A. (1993). The reasons for early weaning among mothers in Teheran. *Bulletin of the World Health Organization*, *71*(5), 561–569.

Summary: The following factors had a negative influence on the duration of breastfeeding: use of supplementary formula and of estrogen-containing oral contraceptives; fathers with high incomes; and mothers with a high educational level. In contrast, the mother's religious motive to breastfeed and her insistence on breastfeeding had a positive impact. Unfortunately, 21% of the mothers started using supplementary formula during the first

month postpartum, and two-thirds before the end of the fourth month. Every month that bottle-feeding was started prematurely shortened the duration of breastfeeding by 20 days. N = 900.

Perez-Escamilla, R., Segura-Millan, S., Pollitt, E., & Dewey, K. (1993). Determinants of lactation performance across time in an urban population from Mexico. *Social Science Medicine*, *37*(8), 1069–1078.

Summary: Breastfeeding was positively associated with planned breastfeeding duration and inversely associated with early introduction of a bottle and urban background. Rooming-in mothers reported that their milk came in earlier ($P < \text{or} = 0.05$) than did the nursery group. Milk arrival was later when a bottle was introduced in the first week. Both of these variables might be important in explaining a positive effect of rooming-in on lactation performance. N = 165.

Samuels, S., Margen, S., & Schoen, E. (1985). Incidence and duration of breastfeeding in a health maintenance organization population. *American Journal of Clinical Nutrition*, *42*, 504–510.

Summary: Formula supplementation in the hospital was associated with a shorter breastfeeding period. The most rapid decline in breastfeeding occurred in the first two weeks postpartum. Because this is the period in which women are most likely to discontinue breastfeeding, it could be a productive target period for support and assistance by health professionals. N = 632.

14. Stress in new mothers and perceptions of perinatal experiences are associated with more difficult transitions to parenthood.

Copeland, D. (2000). Maternal competence and health status in early parenthood. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, *60*(10-B), 5049.

Summary: Self-esteem and perceived social support directly affected postpartum maternal competence. Additionally, pregnancy risk and self-esteem directly affected health status.

Flagler, S. (1990). Relationships between stated feelings and measures of maternal adjustment. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *19*, 441–416.

Summary: The results indicated that self-descriptions of negative physical feelings were related to scores indicating less mothering capability. Self-descriptions of negative emotional feelings were related to poorer relationships with husbands, less life satisfaction, and less support for the maternal role.

Hillervik-Lindquist, C. (1992). Studies on perceived breast-milk insufficiency: Relation to attitude and practice. *Journal of Biosocial Science*, 24(3), 413–425.

Summary: During the course of breastfeeding, attitude changes towards breastfeeding and a sex life in a negative direction were more common in the insufficient-milk crisis group. Fifty-nine percent of all women claimed they experienced less or no sexual desire compared to before pregnancy and, of these, a higher proportion belonged to the crisis group. N = 51.

Mercer, R., Hackley, K., & Bostrom, A. (1983). Relationship of psychosocial and perinatal variables to perception of childbirth. *Nursing Research*, 32(4), 202–207.

Summary: Mate emotional support contributed 20% and early maternal-infant interaction contributed 9.8% of the variance, with total positive self-concept, informative support, instrumental support, type of delivery, and fewer medical complications accounting for the remainder of the total 39%. N = 294.

Oakley, A. (1983). Social consequences of obstetric technology: The meaning of soft outcomes. *Birth*, 10, 99–108.

Summary: The impact of obstetric technology on the outcome of pregnancy has been evaluated by three main categories of outcome measures—those having to do with mortality, physical morbidity, and “psychological” morbidity. There has been a marked preference among obstetricians and epidemiologists for mortality as a measure of outcome. The importance is argued of taking into account the other groups of outcomes, especially the psychosocial or so-called “soft” outcomes. N = 838.

Peterson, G., & Mehl, L. (1978). Some determinants of mother attachments. *American Journal of Psychiatry*, 135, 1168–1173.

Summary: The authors found that the most significant variable predicting the variance of maternal attachment was the length of separation of mother and infant; less separation was associated with greater attachment. The

next most significant variable was birth experience, followed in importance by the length of labor and prenatal attitudes and expectations. N = 46.

Pond, E., & Kemp, V. (1992). A comparison between adolescent and adult women on prenatal anxiety and self-confidence. *Maternal-Child Nursing Journal*, 20, 11–12.

Summary: Results indicated significant negative correlations for both state and trait anxiety during pregnancy and postpartal self-confidence for all women; however, no significant differences occurred in anxiety and self-confidence between the two groups of adolescents and adult women. Results indicated the need for nurses to develop and implement plans for decreasing anxiety and enhancing self-confidence in all pregnant women. N = 93.

15. Childbirth satisfaction among women who receive high levels of support and no/low amount of medications are more positive than among women who receive epidurals or regional blocks.

Hodnett, E. D. (2001). Home-like versus conventional institutional settings for birth. *Cochrane Database System Rev.*, 2001(4), CD000012.

Summary: Six trials, randomised and quasi-randomised trials, involving almost 9,000 women were reviewed comparing a home-like institutional birth environment to conventional hospital care for pregnant women at low risk of obstetric complications. Allocation to a home-like setting was associated with lower rates of intrapartum analgesia/anaesthesia, augmented labor, and operative delivery, as well as greater satisfaction with care.

Hodnett, E. D. (2002). Pain and women’s satisfaction with the experience of childbirth: A systematic review. *American Journal of Obstetrics and Gynecology*, 186(5 Suppl Nature), S160–S172.

Summary: Researchers reviewed 137 reports of childbirth satisfaction with attention to pain and pain relief. When women evaluated their childbirth experiences, they reported that personal expectations, the amount of support from caregivers, the quality of the caregiver-patient relationship, and involvement in decision-making override the variables of age, socioeconomic status, ethnicity, childbirth preparation, the physical birth environment, pain, immobility, medical interventions,

and continuity of care. Thus, the influences of pain, pain relief, and medical interventions on childbirth satisfaction are less than the support of caregivers.

Morgan, B., Bulpitt, C., Clifton, P., & Lewis, P. (1982). Analgesia and satisfaction in childbirth (the Queen Charlotte's 1000 mother survey). *The Lancet*, 2(8302), 808–810.

Summary: Epidural block produced the most effective analgesia; however, fewer dissatisfied women were among those who did not receive this analgesia ($p < 0.05$). Bad-experience scores were evaluated one year later and were clearly related to a forceps delivery and long labor, both of which were more common in the epidural group. Having pain in labor was seen as an essential part of the emotional experience of childbirth by 45% of respondents. $N = 632$.

Poore, M., & Foster, J. (1985). Epidural and no epidural anesthesia: Differences between mothers and their experience of birth. *Birth*, 9(4), 205–211.

Summary: Epidurals were associated with significantly longer labors, more use of oxytocin augmentation, forceps deliveries, and markedly more postpartum bladder catheterizations. Women who did not receive epidurals described a mastery experience that was unique and monumental.

16. Secretory immunoglobulin A (sIgA) is an important immunoprotective factor for infants, and breast milk is an infant's only source of sIgA in the early months of life.

Fitzsimmons, S. P., Evans, M. K., Pearce, C. L., Sheridan, M., Wientzen, R., & Cole, M. (1994). Immunoglobulin: A subclasses in infants' saliva and in saliva and milk from their mothers. *The Journal of Pediatrics*, 4, 566–573.

Summary: The authors concluded that, although secretion of IgA is immature in newborn infants, it increased more rapidly in the first 6 months in saliva of infants that were exclusively breastfed as compared to exclusively bottle-fed infants. $N = 40$.

Garbutt, A.W. (2000). A review of the immunologic and non-immunologic protective factors in human milk. *Nutritional Perspectives*, 23(2), 11–14.

Summary: Human milk is species-specific. Its content, including sIgA, varies with the infant's gestation length, time of day feeding, and length of lactation.

Savilahti, E., Salmenpera, I., & Tainio, V. (1987). Prolonged exclusive breastfeeding results in low serum concentrations of immunoglobulin G, A, and M. *Acta Paediatrica Scandinavica*, 76(1), 1–6.

Summary: Infants do not begin to create their own sIgA until they are 3–4 weeks old; thus, breast milk is their only source of secretory immunoglobulin A (sIgA). Infants only slowly increase their own production of sIgA over the early months.

17. Stress in lactating mothers is associated with altered milk composition, including reduced secretory immunoglobulin A (sIgA) and amylase.

Groer, M., Humenick, S., & Hill, P. (1994). Characterizations and psychoneuroimmunologic implications of secretory immunoglobulin A and cortisol in preterm and term breast milk. *Journal of Perinatal Nursing*, 7(4), 42–51.

Summary: Salivary cortisol, a measure of stress, was inversely related to secretory immunoglobulin A (sIgA) in milk samples of mothers of both preterm and term infants. The findings suggested that cortisol may potentially influence the secretion of milk sIgA. The relationships that were found when comparing psychosocial, dyadic, and stress factors with milk sIgA and cortisol were provocative and suggested new paradigms for studying lactation.

Hart, A. (1996). *The relationships between breast milk secretory immunoglobulin A, maternal salivary amylase, and breast milk amylase*. Unpublished, master's thesis, University of Wyoming, Laramie, Wyoming.

Summary: At one week postpartum, perceived maternal stress was negatively correlated with sIgA ($r = .37$; $p = .009$). At 3 weeks postpartum, perceived maternal stress was negatively correlated with breast-milk amylase ($r = -.46$; $p = .016$).

Jelliffe, D., & Jelliffe, E. (1978). The volume and composition of human milk in poorly nourished communities: A review. *American Journal of Clinical Nutrition*, 8(31), 492–515.

Summary: Study findings suggested that poverty, poor housing, crime, family instability and lack of social support, and feelings of inadequacy about the ability to

breastfeed might have deleterious effects on lactation and on maternal neuroendocrine factors such as cortisol secretion.

18. Interventions that support breastfeeding mothers have the potential to increase breastfeeding duration.

Adams, C., Berger, R., Conning, P., Cruikshank, L., & Dore, K. (2001). Breastfeeding trends at a community breastfeeding center: An evaluative survey. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 30(4), 392–400.

Summary: A hospital-based drop-in center offered professional breastfeeding support and peer interaction. Of the 164 mothers of singleton births (both inpatients and community clients who attended the CBC during a 10-month period), 73% breastfed for 4 months or longer. Primiparae and mothers of preterm infants tended to visit the CBC more frequently, while achieving duration rates similar to other subgroups.

Almiron, P., Fatjo, A., Fernandez, M., Fernandez de Sanmamed, M., Gomez, M., Marti, M., & Relat, V. (1996). Women and breastfeeding: Understanding their experiences and analyzing the performance of the health system. *Atencion Primaria*, 17(8), 501–506 (Spanish).

Summary: Mothers' fear of not feeding the baby well was a major source of breastfeeding failure. Mothers who breastfed for longer periods of time reported receiving more support from their pediatricians. N = 20.

Arlotti, J. P., Cottrell, B. H., Lee, S. H., & Curtin, J. J. (1998). Breastfeeding among low-income women with and without peer support. *Journal of Community Health Nursing*, 15(3), 163–178.

Summary: This research examined the effect of peer support on breastfeeding duration and exclusivity (breastfeeding without supplements) in a population of low-income women during the first 3 months postpartum. Participants in the peer counselor group (n = 18) exhibited higher rates of exclusive breastfeeding across time than those without a counselor (n = 18), and more exclusive breastfeeding was associated with long duration overall.

De Chateau, P., & Wiberg, B. (1977). Long-term effect on mother-infant behavior of extra contact during the first hour postpartum. II: A follow-up at three months. *Acta Paediatrica Scandinavica*, 66, 145–151.

Summary: Primiparous mothers and their infants who had had an extra 15–20 minutes of skin-to-skin and suckling contact (P+) during the first hour after delivery behaved differently, had a longer duration of breastfeeding, and expressed different opinions on child-rearing practices at follow-ups 36 hours, three months, and 12 months after delivery as compared to a control group (P) of primiparous mothers and their infants, who were given routine care immediately after birth.

Humenick, S., & Hill, P. (1995). Insufficient milk supply, nursing Dx and interventions: Final progress report. Funded by NIH NINR R01 NR02297.

Summary: Findings showed that perceived insufficient milk supply (IMS) was the primary reason mothers gave for terminating breastfeeding. Nursing intervention (in the form of home visits) was found to make a significant improvement in reducing the weaning rate due to IMS. N = 460.

McCarter-Spaulding, D. E., & Kearney, M. H. (2001). Parenting self-efficacy and perception of insufficient breast milk. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 30(5), 515–522.

Summary: A significant correlation occurred between a perception of insufficient milk supply and a measure of parenting self-efficacy. Interventions to enhance self-efficacy may improve mothers' confidence in the adequacy of their milk supply. N = 60.

Pastore, M., & Nelson, A. (1997). A breastfeeding drop-in center survey evaluation. *Journal of Human Lactation*, 13(4), 291–298.

Summary: Results suggested the breastfeeding drop-in center is an effective community breastfeeding support strategy. Of those using the service, 81% were breastfeeding at 4 months, 51% were breastfeeding exclusively or primarily, and 50% breastfed to or beyond their intended duration. N = 57.

Pugh, L., Milligan, R., & Brown, L. (2001). The breastfeeding support team for low-income, predominantly-minority women: A pilot intervention study. *Health Care for Women International*, 22(5), 501–515.

Summary: More women who received the intervention of a breastfeeding support team were breastfeeding. Furthermore, they experienced less nipple discomfort in the first month, significantly less fatigue in the fourth month,

and, at three and five months, reported less fatigue and depression. N = 20.

Rousseau, E., Lescop, J., Fontaine, S., Lambert, J., & Roy, C. (1982). Influence of cultural and environmental factors on breastfeeding. *Canadian Medical Association Journal*, 127(8), 701–704.

Summary: The factors that most clearly distinguished the mothers who breastfed were lifestyle, education, and conditioning to the parental role. Those who nursed successfully for a long time were well motivated, well educated, supported by their family (especially the husband) and the La Leche League, and of an economic status that did not require them to return to work soon after delivery.

Stefiuk, W., Green, K. L., Turnell, R., & Smith, B. (2002). Process evaluation of the Saskatoon breastfeeding center. *Journal of Human Lactation*, 18(1), 29–37.

Summary: A process evaluation of the breastfeeding center in Saskatoon was conducted to assess clients' characteristics and satisfaction. Of 75 women who contacted a breastfeeding center, most were still breastfeeding when interviewed 2–4 weeks later and felt that the center had helped them do so.

Wright, A., Rice, S., & Wells, S. (1996). Changing hospital practices to increase the duration of breastfeeding. *Pediatrics*, 97(5), 669–675.

Summary: As a result of hospital policy changes, more infants were put to breast in the first hour, fewer infants were supplemented, and more women received guidance from hospital staff. The duration of breastfeeding was longer for women who did not receive formula-discharge packs or coupons and who roomed-in. N = 776.

19. Breastfeeding is associated with infants experiencing fewer incidents of acute and chronic illnesses. These improved health conditions lead to significant savings in cost care.

Alm, B., Wennergren, G., Norvenius, S. G., Skjaerven, R., Lagercrantz, H., Helweg-Larsen, K., & Irgens, L. M. (2002). Breastfeeding and the sudden infant death syndrome in Scandinavia, 1992–1995. *Archives of Disease in Childhood*, 86(6), 400–402.

Summary: It is commonly observed that the prevalence of bottle-feeding is higher among cases of sudden infant

death syndrome; however, this has not been found in all studies. In Scandinavia, after adjustment for smoking during pregnancy, paternal employment, sleeping position, and age of the infant, the adjusted odds ratio (95% CI) was 5.1 (2.3–11.2) if the infant was exclusively breastfed for less than four weeks, 3.7 (1.6–8.4) for 4–7 weeks, 1.6 (0.7–3.6) for 8–11 weeks, and 2.8 (1.2–6.8) for 12–15 weeks, with exclusive breastfeeding over 16 weeks as the reference. Thus, the study is supportive of a weak relation between breastfeeding and SIDS reduction. N = 244 cases and 869 controls.

Bachrach, V. R., Schwarz, E., & Bachrach, L. R. (2003). Breastfeeding and the risk of hospitalization for respiratory disease in infancy: A meta-analysis. *Archives of Pediatrics and Adolescent Medicine*, 157(3), 237–243.

Summary: Data was reviewed across 33 studies. Among generally healthy infants in developed nations, more than a tripling in severe respiratory tract illnesses resulting in hospitalizations was noted for infants who were not breastfed compared to those who were exclusively breastfed for 4 months.

Ball, T. M., & Wright, A. L. (1999). Health care costs of formula-feeding in the first year of life. *Pediatrics*, 103(4, Pt. 2), 870–876.

Summary: In the first year of life, after adjusting for confounders, there were 2,033 excess office visits, 212 excess days of hospitalization, and 609 excess prescriptions for three illnesses (respiratory tract illnesses, otitis media, and gastrointestinal illness) per 1,000 never-breastfed infants compared to 1,000 infants exclusively breastfed for at least 3 months. These additional health care services cost the managed care health system between \$331 and \$475 per never-breastfed infant during the first year of life. N = 1,588.

Cunningham, A., Jelliffe, D., & Jelliffe, P. (1991). Breastfeeding and health in the 1980s: A global epidemiologic review. *The Journal of Pediatrics*, 118(5), 659–666.

Summary: Breastfed infants demonstrated lower rates of hospital admissions, ear and respiratory infections, diarrheal illnesses, and atopic skin disorders than their bottle-fed counterparts.

Davis, M. K. (2001). Breastfeeding and chronic disease in childhood and adolescence. *Pediatric Clin North Am*, 48(1), 125–141.

Summary: A report from the National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, showed a growing body of research that suggested that infant feeding practices influence the risk for several chronic diseases of childhood and adolescence. Increased risks for Type 1 diabetes, celiac disease, some childhood cancers, and inflammatory bowel disease have been associated with artificial infant feeding and short-term breastfeeding.

Davis, M., Savitz, D., & Graubard, B. (1988). Infant feeding and childhood cancer. *Lancet*, 2(3), 365–368.

Summary: Compared with breastfeeding greater than 6 months, a raised risk for total cancers was found in both breastfeeding less than or equal to 6 months and artificial-feeding groups. This increased risk was largely due to an increased incidence of lymphoma. N = 382.

Holberg, C. (1991). Risk factors for RSV-associated lower respiratory illnesses in the first year of life. *American Journal of Epidemiology*, 133, 135–152.

Summary: A significant interaction demonstrated that breastfeeding had a protective role in relation to respiratory syncytial virus (RSV) associated lower respiratory illnesses (LRI) for those infants of mothers with a lower education level. Infants with lower cord serum RSV antibody, who also had minimal breastfeeding, were found to be especially at risk for RSV-LRIs in the first 5 months of life. N = 1,179.

Istre, G., Conner, J., Broome, C., Hightower, A., & Hopkins, R. (1985). Risk factors for primary invasive *Haemophilus influenzae* disease: Increased risk from day care attendance. *Journal of Pediatrics*, 106, 190–195.

Summary: After controlling for day-care-center/nursery attendance and school-aged siblings, children younger than 6 months of age with the infection were significantly less likely to have been breastfed. This finding suggested a protective effect of breastfeeding. N = 317.

Koletzko, S., Sherman, P., Corey, M., Griffiths, A., & Smith, C. (1989). Role of infant feeding practices in development of Crohn's disease in childhood. *British Medical Journal*, 298(16), 7–8.

Summary: Strong evidence supports findings that human-milk feeding decreased the incidence and/or severity of Crohn's disease in infants.

Kramer, M. S., Chalmers, B., Hodnett, E. D., Sevkovskaya, Z., Dzikovich, I., Shapiro, S., Collet, J. P., Vanilovich, I., Mezen, I., Ducruet, T., Shishko, G., Zubovich, V., Mknuk, D., Gluchanina, E., Dombrovskiy, V., Ustinovitch, A., Kot, T., Bogdanovich, N., Ovchinikova, L., & Helsing, E. (Promotion of Breastfeeding Intervention Trial [PROBIT] Study Group). (2001). Promotion of Breastfeeding Intervention Trial (PROBIT): A randomized trial in the Republic of Belarus. *Journal of the American Medical Association*, 285(4), 413–420.

Summary: Infants from the intervention sites were significantly more likely than control infants to be breastfed to any degree at 12 months; were more likely to be exclusively breastfed at 3 months; and had a significant reduction in the risk of one or more gastrointestinal tract infections and of atopic eczema, but no significant reduction in respiratory tract infection. N = 17,046.

Lucas, A., Brooke, O., Morley, R., Cole, J., & Bamford, M. (1990). Early diet of preterm infants and development of allergic or atopic disease: Randomized prospective study. *British Medical Journal*, 300, 837–840.

Summary: Feeding neonates on formulas based on cow's milk, including those with a high protein content, did not increase the overall risk of allergy. Nevertheless, in the subgroup with a family history of atopy, early exposure to cow's milk increased the risk of a wide range of allergic reactions, especially eczema. N = 777.

Marmot, M., Page, C., Atkins, E., & Douglas, J. (1980). Effect of breastfeeding on plasma cholesterol in young adults. *Journal of Epidemiological Community Health*, 34, 164–167.

Summary: Women who had been breastfed had significantly lower mean plasma cholesterol than women who had been bottle-fed (5.4 mmol/l compared to 5.9 mmol/l). An unexpected finding was the higher mean weight and skinfold thickness in men who had been breastfed. These results supported the hypothesis that factors acting very early in life affect the risk of disease in adults. N = 172.

Mayer, E., Hamman, R., & Gay, E. (1988). Reduced risk of IDDM among breastfed children. *Diabetes*, 37, 1625–1632.

Summary: Cases of insulin-dependant diabetes mellitus (IDDM) were less likely to have been breastfed than controls after adjustment for birth year, maternal age, maternal education, family income, race, and sex (ad-

justed odds ratio [OR] = 0.70; 95% confidence interval [CI] = 0.50–0.97). This finding was consistent for both control groups and by birth-year intervals. N = 747.

Mimouni-Bloch, A., Mimouni, D., Mimouni, M., & Gdalevich, M. (2002). Does breastfeeding protect against allergic rhinitis during childhood? A meta-analysis of prospective studies. *Acta Paediatr*, 91(3), 275–279.

Summary: The effect of breastfeeding on the development of allergic rhinitis was reviewed in prospective studies that evaluated the association between exclusive breastfeeding during the first 3 months after birth and allergic rhinitis. Six prospective studies met the inclusion criteria. The summary odds ratio for the protective effect of breastfeeding was 0.74 (95% confidence interval 0.54–1.01). The effect estimate in studies of children with a family history of atopy was 0.87 (95% confidence interval 0.48–1.58). Exclusive breastfeeding during the first 3 months after birth protected against allergic rhinitis in children, both with and without a family history of atopy.

Rigas, A., Rigas, B., Glassman, M., Yen, Y., Lan, S., Petridou, E., Hsleh, C., Trichopoulos, D. (1993). Breastfeeding and maternal smoking in the etiology of Crohn's disease: An ulcerative colitis in childhood. *Annals of Epidemiology*, 3, 387–392.

Breastfeeding was negatively associated with Crohn's disease (P approximately 0.04) and ulcerative colitis (P approximately 0.07), with relative risk point estimates around 0.5 and with evidence of duration-dependent trends in both instances. No evidence occurred of association of either disease with maternal age at birth, birth order, maternal smoking, or season of birth. N = 309.

Saarinen, U., & Kajosaari, M. (1995). Breastfeeding as prophylaxis against atopic disease: Prospective follow-up study until 17 years old. *Lancet*, 346, 1065–1069.

Summary: The authors concluded that breastfeeding was prophylactic against atopic disease—including atopic eczema, food allergy, and respiratory allergy—throughout childhood and adolescence. N = 236.

Wasmuth, H. E., & Kolb, H. (2000). Cow's milk and immune-mediated diabetes. *Proceedings of the Nutrition Society*, 59(4), 573–579.

Summary: In animal models, cow's milk proteins are modestly and variably diabetogenic; wheat or soybean

proteins in the diet cause higher rates of autoimmune diabetes. The concept of dietary regulation of autoimmunity does not apply only to cow's milk protein but also to other proteins.

Wilson, J. (1984). Whole cow's milk, age and gastrointestinal bleeding. *Pediatrics*, 74, 879–880.

Summary: Findings suggest that breastfeeding up to and beyond the sixth month of life is crucial because nutritionally important intestinal blood loss occurs in infants fed cow's milk before the age of 6 months.

Woodruff, C. (1983). Breastfeeding or infant formula should be continued for 12 months. *Pediatrics*, 71, 984–985.

Summary: Evidence supports findings that demonstrate that infants fed cow's milk before the age of 6 months aids nutritionally important intestinal blood loss, which is why infants should be breastfed or given infant formula for up to 6 months and beyond.

Ziegler, E., Forman, S., Nelson, S., Rebouche, C., Edwards, B., Rogers, R., & Lehman, L. (1990). Cow-milk feeding in infancy: Further observations on blood loss from the gastrointestinal tract. *Journal of Pediatrics*, 116, 11–18.

Summary: The authors concluded that cow-milk feeding leads to increased intestinal tract blood loss in a large proportion of normal infants, and that the amount of iron lost is nutritionally important. N = 52.

20. Breastfeeding is associated with the infant's improved brain and eye development, IQ, emotional attachment, oral jaw development, and hand/eye coordination.

Bauer, G., Ewald, L., & Hoffman, J. (1991). Breastfeeding and cognitive development of 3-year-old children. *Psychological Reports*, 339, 261–264.

Summary: Fifty children were administered the McCarthy Scales of Children's Abilities within one month of their third birthday. Duration of breastfeeding was correlated with scores on the general cognitive, verbal, quantitative, and memory scales.

Lucas, A., Morley, R., Cole, T. J., Lester, G., & Leeson-Payne, C. (1992). Breast milk and subsequent intelligence quotient in children born preterm. *The Lancet*, 339, 261–264.

Summary: A dose-response relation occurred between the proportion of mother's milk in the diet and subsequent IQ. Although these results could be explained by differences between groups in parenting skills or genetic potential (even after adjustment for social and educational factors), data pointed to a beneficial effect of human milk on neurodevelopment. N = 300.

Makrides, M., Neumann, M., Byard, R., Simmer, K., & Gibson, R. (1994). Fatty acid composition of brain, retina, and erythrocytes in breast and formula-fed infants. *American Journal of Clinical Nutrition*, 60, 189-194.

Summary: The higher concentration of docosahexaenoic acid in brains of breastfed infants may explain the improved neurodevelopment reported in breastfed infants compared to formula-fed infants. N = 35.

Morrow-Tlucak, M., Haude, R., & Ernhart, C. (1988). Breastfeeding and cognitive development in the first two years of life. *Social Science Medicine*, 26, 635-639.

Summary: A significant difference between bottle-fed children, children breastfed less than or equal to 4 months, and those breastfed greater than 4 months was found on the Mental Development Index of the Bayley Scales at ages 1 and 2 years, favoring the breastfed children. Supplementary regression analyses examining the strength of the relationship between duration of breastfeeding and cognitive development similarly showed a small but significant relationship between duration of breastfeeding and scores on the Bayley at 1 and 2 years.

Quinn, P., O'Callaghan, M., Williams, G., Najman, J., Andersen, M., & Bor, W. (2001). The effect of breastfeeding on child development at 5 years: A cohort study. *Journal of Pediatrics and Child Health*, 37(5), 465-469.

Summary: After adjusting for a wide range of biological and social factors, the adjusted mean for those breastfed for 6 months or more was 8.2 points higher for females and 5.8 points for males on the Peabody Picture Vocabulary Test Revised when compared to those infants who never breastfed. N = 3,880.

Rogan, W., & Gladen, B. (1993). Breastfeeding and cognitive development. *Early Human Development*, 31, 181-193.

Summary: This study's researchers concluded that, in a volunteer, 95% white sample of middle-class children,

those who were breastfed scored slightly better than those who were bottle-fed. The effect was small but still detectable at school age. N = 855.

Temboury, M., Otero, A., & Polonco, I. (1994). Influence of breastfeeding on the infant's intellectual development. *Journal of Pediatric Gastroenterology and Nutrition*, 18, 32-36.

Summary: Lower results on the Index of Mental Development were associated with bottle-fed infants, lower-middle and lower social class, elementary education of the mother, temper tantrums, and having siblings. N = 229.

Wang, Y., & Wu, S. (1996). The effect of exclusive breastfeeding on development and incidence of infection in infants. *Journal of Human Lactation*, 12, 27-30.

Summary: This study demonstrated the beneficial effects of breastfeeding on infants' development and resistance to infection. N = 145.

21. Breastfeeding is associated with health benefits to mothers. Cortisol levels can be health promoting at some levels and an indication of undue stress at higher levels.

Brock, K., Berry, G., Brinton, L., Kerr, C., MacLennan, R., Mock, P., & Sherman, R. (1989). Sexual, reproductive, and contraceptive risk factors for carcinoma-in-situ of the uterine cervix in Sydney. *Medical Journal of Australia*, 150, 125-130.

Summary: A protective effect was found for women who had had a tubal ligation, for those who practiced the rhythm method of birth control, and for women who breastfed.

Chua, S., Arulkumaran, S., Lim, I., Selamat, N., & Ratnam, S. S. (1994). Influence of breastfeeding and nipple stimulation on postpartum uterine activity. *British Journal of Obstetric Gynaecology*, 101, 804-805.

Summary: Findings indicated possible health benefits for the mothers due to breastfeeding. Breastfeeding increased levels of oxytocin, resulting in less postpartum bleeding and more rapid uterine involution.

Cummings, R., & Klineberg, R. (1993). Breastfeeding and other reproductive factors and the risk of hip fractures in

elderly women. *International Journal of Epidemiology*, 22, 684–691.

Summary: A dose-response relationship occurred between average duration of breastfeeding per child and risk of hip fracture (test for trend: $P < 0.01$). This study suggested that breastfeeding may protect parous women against hip fracture in old age. $N = 311$.

Dewey, K., Heinig, M., & Nommsen, L. (1993). Maternal weight-loss patterns during prolonged lactation. *American Journal of Clinical Nutrition*, 58, 162–166.

Summary: The researchers of this study concluded that lactation enhanced weight loss postpartum if breastfeeding continued for at least six months.

Kramer, F., Stunkard A., Marshall, K., McKinney, S., & Liebschutz, J. (1993). Breastfeeding reduces maternal lower-body fat. *Journal of the American Dietetic Association*, 93(4), 429–433.

Summary: Findings indicated that a woman's choice of infant-feeding practice influenced postpartum anthropometric changes, including hip reduction and weight loss at six months. $N = 24$.

Lankarani-Fard, A., Kritz-Silverstein, D., Barrett-Connor, E., & Goodman-Gruen, D. (2001). Cumulative duration of breastfeeding influences cortisol levels in postmenopausal women. *Journal of Women's Health and Gender-Based Medicine*, 10(7), 681–687.

Summary: Women who breastfed for 12 months and longer had significantly higher cortisol levels (at a level that is health-promoting) than women who breastfed for shorter durations or not at all. This association was stronger among women with three or more births. Duration of breastfeeding is a determinant of cortisol levels in postmenopausal women. Because both increased cortisol and increased duration of breastfeeding may play protective roles in certain autoimmune diseases, such as rheumatoid arthritis, the authors suggested that the beneficial effect of lactation on the course of these diseases may be mediated by cortisol. $N = 749$.

Lipworth, L., Bailey, L. R., & Trichopoulos, D. (2000). History of breastfeeding in relation to breast cancer risk: A review of the epidemiologic literature. *Journal of the National Cancer Institute*, 92(11), 942–943.

Summary: The purpose of this review was to critically evaluate the collective epidemiologic evidence that a his-

tory of breastfeeding may decrease the risk of breast cancer. Overall, the evidence with respect to “ever” breastfeeding remained inconclusive, with results indicating either no association or a rather weak protective effect against breast cancer. An inverse association between increasing cumulative duration of breastfeeding and breast cancer risk among parous women has been reported in some, but not all, studies; the failure to detect an association in some Western populations may be due to the low prevalence of prolonged breastfeeding. It appeared that the protective effect, if any, of long-term breastfeeding was stronger among, or confined to, premenopausal women. It has been hypothesized that an apparently protective effect of breastfeeding may be due to elevated breast cancer risk among women who discontinue breastfeeding or who take medication to suppress lactation; however, the evidence was limited and should be interpreted with caution.

Melton, L., Bryant, S., Wahner, H., Offaloni, W., Malkasian, G., Judd, H., & Riggs, B. (1993). Influence of breastfeeding and other reproductive factors on bone mass later in life. *Osteoporosis International*, 3, 76–83.

Summary: Breastfeeding for more than eight months was associated with greater bone mineral at some sites. A strong protective effect of obesity occurred, which was also correlated with a number of the reproductive variables. While animal studies suggest that pregnancy and lactation may be associated with calcium loss from the skeleton, these data indicated that such factors have little long-term impact on bone mass in humans and little potential for identifying women at high risk of osteoporosis later in life.

Newcomb, P., Storer, B., & Cachon, B. (1994). Lactation and reduced risk of premenopausal breast cancer. *New England Journal of Medicine*, 330, 81–87.

Summary: A reduction in the risk of breast cancer occurred among premenopausal women who had lactated. $N = 14,094$.

Newcomb, P., Storer, B., Longnecker, M., Mittendorf, R., Greenberg, E., Clapp, R., Burke, K., Willett, W., & MacMahon, B. (1994). Lactation and a reduced risk of premenopausal breast cancer. *New England Journal of Medicine*, 330, 81–87.

Summary: A reduction in the risk of breast cancer occurred among premenopausal women who had lactated.

No reduction in the risk of breast cancer occurred among postmenopausal women with a history of lactation. N = 14,094.

22. Breastfeeding is associated with decreased rates of the maternal secretion of stress hormones and decreased negative mood.

Chiopera, P., Salvarani, C., Bacchi-Modewna A., Spallanzani, R., Cignarini, C., Alboni, A., Gardini, E., & Coirvo, F. (1991). Relationship between plasma profiles of oxytocin and adrenocorticotrophic hormone during sucking or breast stimulation in women. *Hormone Research*, 35, 119–123.

Summary: Data showed an inverse relationship between plasma oxytocin (OT) and adrenocorticotrophic hormone (ACTH) levels during suckling and breast stimulation in humans, suggesting an inhibitory influence of OT on ACTH/cortisol secretion in a physiological condition. This would suggest a stress reduction response to breastfeeding. N = 15.

Mezzacappa, E., & Katkin, E. (2002). Breastfeeding is associated with reduced perceived stress and negative mood in mothers. *Health Psychology*, 21(2), 187–191.

Summary: In two studies, breastfeeding mothers perceived less stress and showed a decrease in negative mood. Breastfeeding buffered negative mood. These effects appeared to be attributable to the effects of breastfeeding itself and not solely to individual-differences factors. N = 55.

23. The postpartum period is a vulnerable time because up to half of new mothers may be affected by “the blues” or mood disorders of some degree. Postpartum depressions may persist or lead to serious consequences, including suicide and infanticide.

Bernazzani, O., & Bifulco, A. (2003). Motherhood as a vulnerability factor in major depression: The role of negative pregnancy experiences. *Social Science and Medicine*, 56(6), 1249–1260.

Summary: Previous adverse pregnancy experiences were examined retrospectively in relation to adult lifetime experience of clinical depression. Both adverse non-live and adverse live pregnancy experiences were significantly related to subsequent lifetime depression. Both

types of adverse pregnancy/birth experiences were associated with increased rates of marital problems.

Corrigan, L. (1997). Postpartum depressive symptomology in first-time mothers: Relationship to expectations and postpartum perceptions. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 57(7-B), 4700.

Summary: Infant temperament, dyadic adjustment, and maternal self-efficacy were important in women’s feelings of depression after the birth of their child. N = 54.

Field, T., Pickens, J., Prodromidis, M., Malphurs, J., Fox, N., Bendell, D., Yando, R., Schanberg, S., & Kuhn, C. (2000). Targeting adolescent mothers with depressive symptoms for early intervention. *Adolescence*, 35(138), 381–414.

Summary: Infants of mothers with depressive symptoms showed developmental delays if symptoms persisted over the first 6 months of the infant’s life, thus highlighting the importance of identifying those mothers for early intervention. N = 260.

Glover, V., Onozawa, K., & Hodgkinson, A. (2002). Benefits of infant massage for mothers with postnatal depression. *Seminars in Neonatology* 7(6), 495–500.

Summary: Infant massage by the mother has been popular in many cultures, especially India, and is growing in popularity in the West. Mothers with postnatal depression often have problems interacting with their infants. A small, controlled study demonstrated that attending a massage class can help such mothers relate better to their babies. The mechanisms by which this is achieved are not clear but may include learning to understand their babies’ cues and the release of oxytocin.

Hamilton, M. (1988). *Maternal depressive affect: Its effect on infant affective regulation*. Unpublished doctoral dissertation, Boston University.

Summary: When compared to infants of nondepressive symptomatology mothers, infants of mothers with depressive symptomatology were characterized emotionally by significantly more displays of anger and significantly fewer displays of infant joy and interest.

Knops, G. (1993). Postpartum mood disorders. A startling contrast to the joy of birth. *Postgraduate Medicine*, 93(3), 103–104.

Summary: More than half of new mothers may be affected by mood disorders after childbirth. Possible causes

and recommended management depend on the type of disorder and its severity. In this article, the author discusses recognition, prevention, and management of three types of postpartum mood disorders, as well as the need for support for a woman and her family at this vulnerable time.

Metastasio, P., Verdecchia, P., D'Urzo, E., & Mazzone, T. (1995). Postpartum depression. *Minerva Ginecologica*, 47(1-2), 43-45. (Italian)

Summary: A review of the literature revealed that postnatal depression was present in 10%–15% of women during the first year after birth. Some studies have shown that a higher percentage of women with problems of depression commit infanticide compared to nondepressed women.

Riecher-Rossler, A. (1997). Psychiatric disorders and illnesses after childbirth. *Fortschritte der Neurologie Psychiatrie*, 65(3), 97-107. (German)

Summary: After childbirth, from about a quarter up to nearly one half of all puerperae develop a short-lasting, mild affective distress, the so called “blues.” During the first months after delivery, about 10%–15% of all young mothers suffer from a longstanding depression that is so severe that they are in need of treatment. In one or two out of 1,000 women even a psychotic disorder becomes manifest. These disorders—apart from the blues—are very serious, with potentially severe consequences for the mother, the baby, and possibly the whole family.

Salmela-Aro, K., Nurmi, J., Saisto, T., & Halmesmaeki, E. (2001). Goal reconstruction and depressive symptoms during the transition to motherhood: Evidence from two cross-lagged longitudinal studies. *Journal of Personality and Social Psychology*, 81(6), 1144-1159.

Summary: An increase in creating family-related goals during pregnancy and after the birth of the child predicted a decline in women's depressive symptoms. N = 1,348.

Limitations

For the assertions listed above, the references represent only a sample of the available research. Studies large enough to control for intervening variables are lacking or few in number for some of these assertions. However, as a group, these studies support assertions about linkages that, collectively, are logical, compatible with each other, and fit with experiential knowledge. Thus, collectively, they present useful evidence.

Implications for Perinatal Educators

The evidence here presents a strong case for a coordinated perinatal health care system that comprehensively attends to integrated bio-psycho-social care across the perinatal year. Perinatal educators can be instrumental in influencing society to recognize and value that type of care.

The National Women's Health Information Center Has New Breastfeeding Helpline

Call with Your Questions: 1-800-994-9662

The National Women's Health Information Center has partnered with La Leche League International to train information specialists so they can help with common breastfeeding issues such as nursing positions, questions about pumping and storage, and provide the public with the support moms and dads need to make breastfeeding a success. The Helpline (which operates in both English and Spanish) can also provide tips for working moms who would like to continue breastfeeding, and offer suggestions for financial support. The Helpline is open to nursing mothers as well as their partners, families, prospective parents, health professionals, and institutions seeking to better educate new mothers about the benefits of breastfeeding.

The Helpline is available Monday through Friday, from 9 a.m. to 6 p.m., EST.