B. Fostering an Optimal Womb Environment

- **Honor Pregnancy as a Natural Event (Not a Medical Condition) and Recognize the Importance of the Mother's Emotional, Mental, and Physical Well-being; a Safe Environment; and a Strong Support System**

B.1. Active involvement of the father as a vital partner during pregnancy and childbirth preparation, including parental consensus and consistency in parenting values and practices.

Bloom, K. C. (1998). Perceived relationship with the father of the baby and maternal attachment in adolescents. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 27(4), 420-430.

Premise: The higher the adolescent mother's perception of her relationship with the father of the baby, the greater the maternal-fetal and maternal-infant bond

Research Hypothesis: Adolescent mother's perception of her relationship with the father of the child impacts the development of attachment behaviors during the pregnancy and early postpartum period.

Subjects: Seventy-nine pregnant adolescents, ages 12 to 19 years, attending one of four antepartum clinics for low-income women.

Study Design: Each adolescent was interviewed at four stages during the pregnancy and early postpartum period: less than 20 weeks gestation (n = 79), 20-29 weeks gestation (n = 64), 30-40 weeks gestation (n = 54), and within one week of delivery (n = 47). The perceived relationship with the father of the baby was rated on a five-point Likert-type scale. Maternal-fetal attachment was assessed using a 24-item, five-point Likert-type scale. Each of the above was assessed at stages 1-3. Maternal-infant attachment was rated by using Avant's Maternal Attachment Assessment Scale during observation at one week postpartum. Also, the perceived relationship with the father of the baby was reassessed at this time.

Findings: The adolescents reported a feeling of closeness with the baby throughout the pregnancy, with a significant increase after birth. When scores on maternal-fetal attachment were combined with a positive perception of the relationship with the father, a significant correlation was found to maternal-infant attachment.

Research reviewed by Dara Steele, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Curry, M. A., Perrin, N., & Wall, E. (1998). Effects of abuse on maternal complications and birth weight in adult and adolescent women. *Obstetrics and Gynecology*, 92(4), 530-534.

Premise: Physical and/or sexual abuse of women during pregnancy and the period around pregnancy has been identified as a serious health risk to both the mother and her infant.

Research Questions: Does physical and/or sexual abuse cause maternal complications? Does physical and/or sexual abuse lead to decreases in birth weights of infants born to adult and adolescent women?

Background: The study was conducted in Portland, OR. A total of 1,897 women were interviewed while attending one of six prenatal clinics. Women were asked the same three questions as part of the assessment: 1) Within the last year, have you been hit, slapped, kicked, or otherwise physically hurt by someone? 2) Since you have been pregnant, have you been hit, slapped, kicked, or otherwise physically hurt by someone? 3) Within the last year, has anyone forced you to have sexual activities?

Subjects: Subjects consisted of 1,897 women attending six prenatal clinics in Portland, OR. Fifty-eight percent of the participants were white, 26.6% African American, 4.9% Hispanic, 3% Native American, 2.6% Asian, and 4.9% other. Thirty percent were adolescent. Among the adolescents, 8.6% were married and 28% lived with a partner. Among the adults, 37.8% were married and 26% were living with a partner.

Study Design: Study design was prospective, descriptive. A graduate-nursing student privately interviewed each woman in an exam room as part of a routine prenatal visit.

Findings: In the past year or during the pregnancy, 27% of the women who were interviewed reported physical abuse, and 4.5 % reported sexual abuse. Adolescents were more likely to report physical and/or sexual abuse. African American, Native American, and women belonging to ethnic groups described as "Other" in this study were significantly more likely to report abuse. In general, women reporting abuse were less educated, younger, had more previous pregnancies, and were poorer. If reported, abuse was

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related to poor obstetric history, drug and alcohol abuse, and low birth weights.

Research reviewed by Debra Lynn Magee, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.2. Access to physical, emotional, and spiritual support from empathetic family, friends, and community.

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

Premise: An effect of social support and stress exists on expectant mothers and fathers.

Research Question: What is the effect of social support and stress on the health of expectant mothers and fathers?

Subjects: A total of 313 expectant couples in the second trimester of pregnancy.

Study Design: Participants were evaluated using questionnaires to assess their partner support and satisfaction with that support, and to measure stress and chronic illnesses delineating between men and women. Questionnaires were given during care in prenatal clinic and also during child-birthing class. These questionnaires were completed and returned via self-addressed, stamped envelopes. The Support Behavior Inventory, using the Satisfaction with Partner Support and Satisfaction with Other People Support subscales, was used and revealed internal consistency reliabilities of .97 and .98 as assessed by Cronbach's alpha. The Health Responses Scale was used to determine perceived levels of illness and wellness in the participants with a Cronbach's alpha of .89. Stress levels were calculated using the Stress Amount Checklist with an internal consistency of .72 using Cronbach's alpha.

Findings: 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.

Research reviewed by Neoma Bower, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Rogers, M. M., Peoples-Sheps, M. D., & Suchindran, C. (1996). Impact of social support program on teenage prenatal care use and pregnancy outcomes. *Journal of Adolescent Health*, 19, 132-140.

Premise: A resource mothers program (RMP) has an effect on the acquisition and continuation of prenatal care, low birth weight, and preterm birth.

Research Question: What effect does the use of mentors have on the initiation and continued use of prenatal care, low birth weight rates, and preterm birth rates?

Background: A lack of social support in an at-risk group (low-income, nonwhite, adolescents) is felt to contribute to maternal health issues and risks for their newborns.

Subjects: A total of 1,901 primiparous adolescents were placed in the mentoring group and compared with other counties (4,613 adolescents) where the program was not available. Referrals were from the food program for Women, Infants, and Children, prenatal clinics, human services agencies, schools, churches, etc.

Study Design: Participants in the study were compared to the same population (16 years of age or younger and 17-18 years of age) in other counties in which the mentoring program was not available. Other factors were marital status, race, age, and previous pregnancies. The mentored-group data and other-counties data were collected and entered into the Maternity Data System. Birth certificates on all babies born to these women were obtained from Vital Statistics. Approximately 95% of the women in this study were followed by the Department of Health. Mentors were paraprofessional women who received three weeks of training.

Findings: The adolescent participants in the mentored group were found to be more likely to begin prenatal care early in their pregnancy and to continue, when compared with those in the other-counties group. No significant difference was noted in the low birth weight rate among babies born to either group members. However, those in the RMP group were less likely to experience preterm birth than their cohorts in the other-counties group.

Research reviewed by Neoma Bower, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Gottlieb, L., & Mendelson, M. (1998). Mothers' moods and social support when a second child is born. *Journal of Maternal-Child Nursing*, 23(1), 3-13.

Premise: The transitions to second-time mothering includes facing multiple demands and balancing personal and family needs.

Research Hypothesis: Different types of support serve different functions before and after birth. Support must fit the mother's perceived needs.

Subjects: This study included married mothers expecting a second child when their first-born child was already 28-54 months old. The sample consisted of 90% Caucasian women. The age range of the mothers was 26-40 years old. Average educational preparation included 13 years of formal education.

Study Design: Descriptive. Mothers were visited on two occasions. Questionnaires were used to collect demographic characteristics and note change over time in the variables of interest. Stress was measured using a stress checklist. Maternal mood, along with the type and amount of support provided, were analyzed for patterns.

Findings: Depressed, angry, and/or tired mothers reported a perception of inappropriate amounts of support and dissatisfaction with the nature of the support that they did receive.

Research reviewed by Sheila Hopkins, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Reece, S. (1993). Social support and the early maternal experience of primiparas over 35. *Journal of Maternal-Child Nursing*, 21(3), 91-97.

Premise: Maternal experience is affected by age.

Research Hypothesis: Older first-time mothers experience the transition to parenthood differently than their younger counterparts.

Subjects: A total of 91 first-time mothers over the age of 35 years.

Study Design: Longitudinal descriptive design was used to assess the relationships between social support and early maternal experience in primiparas. Data was collected during the last trimester and after one month postpartum.

Findings: Consistent with the literature on social support and transition to parenthood, social support had positive influences on the mother's self-evaluation and stress levels. Also, social support positively affected maternal perception of parenting ability and diminished perceived stress levels in the early postpartum period.

Research reviewed by Sheila Hopkins, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

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.

Premise: A link exists between postpartum support and depression in African-American women.

Subjects: A total of 57 African-American women, 4-6 weeks postpartum.

Study Design: Descriptive.

Findings: In this sample, 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 their well-being.

Research reviewed by Sheila Hopkins, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.3. Supportive, sincere, and caring partnerships with prenatal care providers, including access to a midwifery model of care and information about potential risks and benefits of medical procedures (e.g., ultrasound, amniocentesis, or extended bed rest).

MacDorman, M., & Singh, G. (1998). Midwifery care, social and medical risk factors, and birth outcomes in the USA. *Journal of Epidemiology Community Health*, 52, 310-317.

Premise: Certified nurse-midwives provide a safe and viable alternative to maternity care for low- to moderate-risk women.

Research Questions: Are there significant differences in birth outcomes and survival for infants delivered by certified nurse-midwives in comparison to physicians? Do the differences still exist after controlling sociodemographic and medical risk factors?

Background: Proponents of midwifery care have often claimed that better outcomes result from the midwifery model of practice. Those who disagree contend that the data this conclusion is based upon is skewed. However, because the birth outcome data of physicians includes all of the high-risk patients they deliver (such as the extremely preterm infants and the severely distressed fetuses), their data cannot avoid skewing from "physical risk." Nurse-midwives, on the other hand, attend a greater proportion of "socially high-risk" women, such as adolescents, women living in poverty, women with less than a high school education, and socially disadvantaged ethnic minorities. A need exists to standardize the social and medical risk factors of groups of women attended by nurse-midwives and physicians *before* valid comparisons can be made regarding their relative "successes."

Subjects: This study included all single vaginal births at 35-43 weeks gestation delivered by certified nurse-midwives in the United States in 1991, as well as a 25% random sample

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of women from the same population delivered by physicians in the United States in 1991. The study used statistical data from the National Linked Birth/Infant Death Data Set for the 1991 cohort.

Study Design: Logistic regression models were used to examine differences in infant, neonatal, and postneonatal mortality, low birth weight, and mean birth weight between babies whose births were attended by certified nurse-midwives and babies whose births were attended by physicians. Ordinary least squares regression models were used to examine differences in mean birth weight after controlling for the following risk factors: maternal age, race, education, marital status, birth order, month of pregnancy prenatal care began, and gestation age at delivery. Certain medical risk factors, as well as obstetrical complications, were also controlled.

Findings: After controlling all the medical and social risk factors, the risk of experiencing infant death was 19% lower for certified nurse-midwives attending births versus physicians attending births. The risk of neonatal mortality was 33% lower and the risk of delivering a low birth weight infant was 31% lower. The mean birth weight of a midwife-attended birth was 37 grams heavier than a physician-attended birth. In spite of differences between physicians and nurse-midwives in their approaches to delivery care, the midwives had excellent birth outcomes. A primary factor contributing to the excellent outcomes of nurse-midwives is likely the personalized care that they provide to the women they serve. They are with their patients on a one-on-one approach during the entire process, while a physician's care is more episodic. Other studies have indicated that, with such continuous support, these women have shorter labors, lower cesarean-section rates, lower rates of anesthesia and oxytocin use, and more positive birth experiences. While such outcomes are "softer" than neonatal mortality, they, too, indicate that births can be improved under the care of a nurse-midwife. Two primary conclusions are drawn in this article. First, nurse-midwives are associated with better neonatal mortality than that of physicians in matched populations of low- to moderate-risk women. Secondly, the most likely reasons for this success are the counseling, emotional support, and empowerment of women that characterize the midwifery model of care.

Research reviewed by Tracie Mudge, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Kennedy, H. P. (1995). The essence of nurse-midwifery: The woman's story. *Journal of Nurse-Midwifery*, 40(5), 410-417.

Premise: Women's experience of pregnancy and childbirth is different when they are attended by midwives.

Research Question: What is the "experience of the woman [during pregnancy and childbirth] cared for by a nurse-midwife" within a feminist philosophical framework?

Background: When women feel that the context of their lives is recognized and respected in their care, they feel more empowered to make decisions regarding their pregnancy and birth.

Subjects: The participants for this study were recruited from two practices chosen because of their diversity in clients, both ethnically and economically, as well as in birth settings. All participants were over the age of 18 (mean age, 31) and had the majority of their care from nurse-midwives during their childbearing year and birth. Three women were primiparas and three women were multiparas.

Study Design: Phenomenology (a descriptive, inductive methodology that explores the essences of experience) is a qualitative research approach. Each participant was contacted by telephone to set up an interview, which was unstructured and lasted 30-60 minutes. Each woman was asked the following, "Please describe what your experience was like to be cared for by a nurse-midwife during your prenatal visits, birth, and postpartum contacts. Describe all your thoughts, feelings, and perceptions of these experiences that you remember, until you have no more to say." Their statements were supplemented with probing via open-ended questions when additional clarification was desired.

Findings: Nine theme clusters emerged as a result of this study:

- 1) The woman, as an individual, determines and directs care. The nurse-midwife consistently validated the woman's ability to cope with birth and her changing family. The willingness to explore all possibilities was highly valued.
- 2) Development of a caring relationship built on mutual respect, trust, and alliance emerged. The women felt that the nurse-midwife shared in their experience and provided a personalization in their care.
- 3) The qualities and behaviors of the nurse-midwife laid the foundation for the richness of the woman's experience. The nurse-midwife composure prevailed, her aura of calm that exuded experience and knowledge assisted in the confidence building of the mother.
- 4) A sense of safety encompassed the women's trust in the nurse-midwife's knowledge and ability. The sense

of trust that was built between the mother and the midwife added in a positive outcome.

- 5) The woman felt cared for within the domain of her family and her family's needs, and potentials were always considered in relationship to her. The children and partners were encouraged to participate in the care.
- 6) Time was both given and respected by the nurse-midwife. The midwife accommodated the mother's needs and the mother didn't feel rushed.
- 7) The woman (and her family) felt guided in her decision-making and actions based on the information provided by the nurse-midwife.
- 8) The health and normalcy of pregnancy were the presiding focus of care. Interventions were an option but not pushed.
- 9) A continuous link with the nurse-midwife was repeatedly demonstrated. The nurse-midwife was there for the woman—whether at the end of the phone or in the labor room—and her presence was felt and valued.

The women deeply appreciated the respect that they felt from the nurse-midwives. Also, the women felt empowered by this respect, which helped lay a foundation of an enriched self-confidence and willingness to take on more of the responsibilities for making decisions regarding themselves, their pregnancies, and their childbirths.

Research reviewed by Tracie Mudge, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Maloni, J., Cheng, C., Liebl, C., & Maier, J. (1996). Transforming prenatal care: Reflections on the past and present with implications for the future. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 25(1), 17-23.

Premise: Our present model of prenatal care may be outdated and focused on pre-eclampsia rather than on our current outcome problems.

Research Question: Is the current model of prenatal care effective for positive birth outcomes?

Background: Two-thirds of all infant deaths and neonatal deaths in the United States occur in low birth weight (LBW) infants. Nineteen other industrialized countries have lower rates of infant mortality than the United States. Our pattern of prenatal care originated 100 years ago when pre-eclampsia was a major concern.

Study Design: The article is a compilation of over 10 separate studies pertaining to the history of prenatal care, areas

of prenatal care that are identified as deficits, and government statistics of pregnancies and birth outcomes.

Findings: Low birth weight is the primary risk factor related to infant mortality and morbidity and has not declined in the last 10 years. The number of LBW babies triples when women receive no prenatal care. Between 1980 and 1987, the percentage of women who did not receive prenatal care increased by 17% for white women and 26% for black women. For every dollar spent on prenatal care, \$2 to \$11 is saved in the costs of treating premature infants and their complication. Forty-four percent of physicians who provide obstetric services do not accept Medicaid patients, a group that includes patients with the highest rates of LBW. The current model of prenatal care has not attracted women at high risk, such as women who are younger than 20 years of age, unmarried, ethnic minorities, poorly educated, or with high parity. Lack of private transportation, poor weather, and unreliable public transportation add to some women's lack of attendance. The lack of prenatal care results in an increase of LBW infants, which in turn increases costs related to premature births and their complications.

Research reviewed by Tina Hill, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Oakley, D., Murray, M., Murtland, T., Hayashi, R., Anderson, F., Mayes E., & Rooks, J. (1996). Comparisons of outcomes of maternity care by obstetricians and certified nurse-midwives. *Obstetrics and Gynecology*, 88, 823-829.

Premise: A nurse-midwife-led delivery will ensure a better outcome at birth at a lower cost.

Research Question: Do pregnancy outcomes differ by provider group when alternative explanations are taken into account?

Background: This study was conducted at a Midwestern tertiary-care center and its ambulatory care satellite and hospital clinics. All deliveries were at the medical center's hospital.

Subjects: Pregnancy outcomes were compared among 710 women cared for by private obstetricians and 471 women cared for by the nurse-midwife group. All women cared for qualified for nurse-midwifery care. All were retained in the original group for analysis, even if they were later referred to physicians.

Study Design: Infant and maternal mortality, 30 clinical indicators, satisfactions with care, and monetary charges were studied. The study site had a history and philosophy

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of honoring consumer choice of provider-precluded random assignment. Multivariate analysis was used for this study.

Findings: Significant differences were found in seven factors in this study between obstetricians and nurse-midwives. Infant abrasions were higher with obstetricians by 3%. For physicians, infants remaining with mothers throughout hospital stay were 15% versus 27%. Third- and fourth-degree perineal lacerations were 23% versus 7%. The number of postdelivery complications was lower in the nurse-midwifery provider group than in the obstetrician group. Hospital stays and professional fees on average were less with the midwifery group. To improve outcomes and control costs in maternity care, a reduction needs to occur in the following areas: women's pregnancy and intrapartum risks, the number of medical procedures, and the women's preferences for the more expensive interventions. Both obstetrician and nurse-midwives could contribute to these goals.

Research reviewed by Tracie Mudge, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.5. A nutritionally balanced diet supplemented with prenatal vitamins and minerals.

Godfrey, K., Robinson, S., Barker, D. J. P., Osmond, C., & Cox, V. (1996). Maternal nutrition in early and late pregnancy in relation to placental and fetal growth. *British Medical Journal*, 312, 410-414.

Premise: Nutrient intake during early and late pregnancy affects the growth and weight of the placenta and the fetus.

Research Question: How does the intake of nutrients affect placental and fetal birth weights if consumed during different times of pregnancy?

Background: The amount of carbohydrates, proteins, and dairy products consumed during pregnancy has an effect on placental and fetal growth.

Subjects: A total of 538 mothers who delivered at term. Subjects were aged 16 years or older.

Study Design: A food-frequency questionnaire was administered during early and late pregnancy. Food diaries were kept over four days for early pregnancy estimates. A trained research nurse visited mothers at their homes. At birth, the baby was weighed to the nearest 5 g. The placenta was also weighed on digital scales.

Findings: A relationship existed between placental/fetal size and carbohydrate and protein intake during pregnancy.

During early pregnancy, a high consumption of carbohydrates was associated with a decrease in placental and birth weights. This was especially so if consumed with a low dairy protein in late pregnancy. Also during late pregnancy, a high consumption of iron and folate supplements was associated with higher placental and birth weights.

Research reviewed by Angie Calixto RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Czeizel, A., & Dudas, I. (1992). Prevention of the first occurrence of neural-defects by periconceptional vitamin supplement. *The New England Journal of Medicine*, 327(26), 1832-1834.

Premise: The use of a multivitamin supplement or a folic acid supplement alone during the periconceptional period will reduce the risk of neural-tube defects.

Research Question: Can the administration of multivitamin supplements or a folic acid supplement during the periconceptional period alone prevent neural-tube defects?

Subjects: Women planning a pregnancy with the following criteria: no delayed conception or infertility, not currently pregnant, less than 35 years of age, and no previously wanted pregnancy.

Study Design: Women entered the study three months prior to attempts of conception. They were randomly assigned to receive a vitamin supplement or trace-element supplement. They continued taking these supplements while attempting to conceive. Once pregnancy was confirmed, the supplements were supplied until the third month of gestation. All deliveries and terminations were recorded, including detailed information of the appropriate diagnosis or description of congenital malformations. The women also completed summaries of the outcomes of their pregnancies, including the date of delivery, sex, weight, gestational age, and presence or absence of congenital defects.

Findings: Pregnancy was confirmed in 4,753 women. Pregnancy outcomes were known in 2,104 women who received the vitamin supplements and in 2,052 women who received the trace-element supplement (22.9 per 1000 vs. 13.3 per 1000, $p = 0.02$). Six documented cases of neural-tube defects occurred in the group receiving the trace-element supplement. No cases of neural-tube defects occurred in the vitamin-supplement group ($p = 0.029$). Periconceptional vitamin use is associated with decreased incidence of neural-tube defects.

Research reviewed by Deidre Bennett Morrow, RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.6. Activities that promote emotional and mental well-being and strengthen and tone the body, such as walking, prenatal exercise, yoga, tai chi, singing, meditation, and focusing on positive stories about natural, healthy birth.

Bungum, T. J., Peaslee, D. L., Jackson, A. W., & Perez, M. A. (2000). Exercise during pregnancy and type of delivery in nulliparae. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 29(3), 258-264.

Premise: Women are less likely to deliver by cesarean when participating in prenatal exercise.

Research Question: Does participation in aerobic exercise during the first two trimesters of pregnancy influence the type of delivery—vaginal or cesarean—in nulliparous women versus those who do not exercise during pregnancy?

Background: Previous research has shown that aerobic exercise during a healthy pregnancy does not compromise fetal growth or development, nor does it complicate the processes of pregnancy, labor, or delivery. Benefits gained from exercising during pregnancy include less pregnancy-related discomfort, shortened labor, and a higher rate of vaginal deliveries.

Subjects: One hundred thirty-six nulliparous women who attended hospital-based childbirth education classes or those who attended a private fitness center that offered a prenatal aerobic exercise program. Participants were residents of a large metropolitan area in the southwestern United States who did not smoke, expected a singleton birth, were aged 17 to 40 years at time of delivery, and did not have gestational diabetes, preeclampsia, high blood pressure, or abnormal bleeding during the pregnancy.

Study Design: Initial data were collected via a 31-item written survey that included a checklist to measure physical activity. Answers on the checklist allowed the division of the participants into the categories of either *active* or *sedentary* women, based on the amount of time and average number of times per week that they engaged in physical activity. Follow-up phone calls were made approximately two weeks after the expected delivery date.

Findings: The risk of a cesarean delivery was increased by 4.5 % for sedentary women as compared to active women. This was evidenced by logistic regression analysis that controlled for the mothers' prepregnancy exercise program, age, use of epidural anesthesia, change in prepregnancy to delivery body mass index, and the hospital of birth. The overall cesarean rate in this study was 24%. The rate of cesarean delivery among the physically active group was

15.9%. Findings suggested that women were less likely to deliver by cesarean in association with aerobic exercise performed at least three times a week for at least 20 minutes per session.

Research reviewed by Terry L. Goble, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Beckmann, C. R. B., & Beckmann, C. A. (1990). Effects of a structured antepartum exercise program on pregnancy and labor outcome in primiparas. *Journal of Reproductive Medicine*, 35(7), 704-709.

Premise: Nonendurance exercise regimens have the ability to influence factors that influence labor.

Research Hypotheses: Primiparas who participate in a nonendurance antepartum exercise program are less likely to require oxytocin augmentation of labor, more likely to have shorter first and second stages of labor, and more likely to have spontaneous vaginal deliveries than primiparas who do not exercise.

Background: Routine exercise programs have become an important part of many women's lifestyles, therefore prompting the need for further information on the effects of exercise on labor augmentation, duration of labor stages, and the type of delivery that these women experience once they become pregnant.

Subjects: Fifty exercising and fifty nonexercising primiparas who received private obstetric care from physicians on the staff at a large Midwestern medical center where they gave birth.

Study Design: A prospective, descriptive study included follow up of the subjects' date of delivery by return postcard. This information allowed for a review of the subjects' medical records to obtain the desired information on whether or not labor was augmented, the length of first and second stages of labor, and type of delivery.

Findings: Of the 50 primiparas who exercised, 1% had their labor augmented with oxytocin as compared to 4% of the nonexercising primiparas who augmented labor with oxytocin. First-stage labor experienced by exercising primiparas was shorter by a mean length of 6.9 hours than for nonexercising primiparas. Second-stage labor experienced by exercising primiparas was shorter by a mean length of 1.1 hours than for nonexercising primiparas. Among the women, 22.5% of the exercising primiparas experienced spontaneous vaginal births compared with 14% of the nonexercising primiparas. Additionally, 2.5% of exercising primiparas experienced cesarean delivery com-

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pared to 11% of the nonexercising primiparas who delivered by cesarean.

Research reviewed by Terry L. Goble, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Manders, M. S. M., Sonder, G. J. B., Mulder, E. J. H., & Visser, G. H. A. (1997). The effects of maternal exercise on fetal heart rate and movement patterns. *Early Human Development*, 48, 237-247.

Premise: Maximal maternal exercise can have a negative effect on fetal heart rate (FHR) and on body and breathing movements.

Research Question: What are the effects of maternal exercise on FHR and on body and breathing movements when compared to the level of maternal exercise?

Background: Fetal response to maternal exercise depends on the level of exercise.

Subjects: Twelve healthy pregnant women between 29 and 32 weeks gestation participated in this study.

Study Design: Experimental and control sessions were carried out on two consecutive days with each session consisting of two one-hour recordings of maternal heart rate (MHR), FHR, and fetal movements. Exercise was performed on a bicycle-ergometer with the initial load of 50W increased by 25W every five minutes until the woman decided herself that she was exercised maximally. The maximal load was continued for five minutes. MHR was monitored continuously using surface electrodes and recorded on a fetal cardiocograph. MHR in the hour preceding exercise and maximal heart rate reached during exercise were used to calculate the percentage of maximal increase in heart rate. FHR was monitored by Doppler ultrasound. FHR was used by the Sonicaid 8000 FHR analysis program to calculate the basal heart rate and heart rate variation. Fetal body and breathing movements were visualized using a real-time ultrasound scanner and were recorded for off-line analysis.

Findings: Results of the accrued data indicate that basal FHR and fetal breathing movements increased, yet FHR variations and fetal body movements decreased after a moderate exercise session. An overall decrease was found in all four parameters after a heavy exercise session. These findings clearly indicate that the level of maternal exercise has a significant impact on the human fetus. Temporary impairment of the fetus occurred during maximum exercise; therefore, maximum exercise should be discouraged. Moderate exercise did not result in impairment to the fetus.

Research reviewed by Terry L. Goble, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.7. A lifestyle free from toxic substances (including tobacco, alcohol, over-the-counter medications, nonessential prescriptions, and other drugs).

Shah, N., & Bracken, M. (2000). A systemic review and meta-analysis of prospective studies on the association between maternal cigarette smoking and preterm delivery. *American Journal of Obstetrics Gynecology*, 182(2), 465-472.

Premise: Maternal cigarette smoking during pregnancy is associated with preterm delivery.

Research Question: What are the adverse effects of maternal cigarette smoking on the newborn?

Background: Maternal smoking has a strong association with low birth weight, spontaneous abortions, ectopic pregnancy, impaired respiratory function in the newborn, and abruptio placentae, in addition to preterm labor.

Subjects: Twenty published articles reporting results from original data.

Study Design: Meta-analysis computed with the Mantel-Haenszel fixed-effects model.

Findings: The combined findings of this meta-analysis show a strong relationship between maternal smoking and preterm delivery. Cigarette smoking is a preventable risk factor for preterm labor.

Research reviewed by Angie Calixto RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Moore, M. L., & Zaccaro, D. J. (2000). Cigarette smoking, low birth weight, and preterm births in low-income African American women. *Journal of Perinatology*, 3, 176-180.

Premise: Smoking during pregnancy leads to low birth weight (LBW) and preterm birth more frequently in African-American women than in any other group of pregnant women.

Research Question: What are the effects of light and heavy cigarette smoking on the incidence of LBW and preterm births in African-American women?

Background: A cigarette is a small roll of finely chopped fine tobacco wrapped in thin paper for smoking.

Subjects: A total of 1,146 African-American pregnant women, all of whom received regular prenatal care.

Study Design: All participants took part in a randomized prospective trial to see if preterm births and LBW can be reduced with nursing intervention. This study was a second-

ary analysis of data that examined the effects of cigarette smoking on LBW (<2500 grams) and preterm births (<37 weeks gestation). In the original study, data on smoking, drug and alcohol use, and physical abuse were collected during the initial interview at the patient's home. Two to three times a week, a nurse conducted telephone interviews with the participants until 37 weeks gestation. These telephone interviews focused on nutrition, domestic violence, alcohol or other substance abuse, smoking, and overall health. Birth weight and gestational age were obtained from medical records.

Findings: Smoking had a significant effect on LBW and preterm birth rates in this sample of African-American women. Nonsmokers had a LBW rate of 10.6%, compared to light smokers who had a LBW rate of 18.4% (Odds Ratio [OR], 1.89; Confidence Interval [CI] 1.15, 3.13; $p=0.0127$) and heavy smokers who had a LBW rate of 26.5% (OR 3.03; CI 1.90, 4.86; $p=0.001$). In comparing preterm births, nonsmokers had a preterm rate of 9.2% versus light smokers who had a rate of 14.4% (OR 1.74; CI 1.00, 3.02; $p=0.049$) and heavy smokers who had a rate of 20.4% (OR 2.60; CI 1.55, 4.35; $p=0.0003$).

Research reviewed by Julie Corpuz, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Tronick, E. Z., Frank, D. A., Cabral, H., Mirochnick, M., & Zuckerman, B. (1996). Late dose-response effects of prenatal cocaine exposure on newborn neurobehavioral performance. *American Academy of Pediatrics*, 98(1), 76-84.

Premise: Prenatal cocaine exposure causes prolonged effects on newborn behavior.

Research Question: Can a dose effect of prenatal cocaine exposure on neonatal neurobehavioral performance be demonstrated?

Background: Early research suggested significant neonatal neurobehavioral dysfunction associated with prenatal exposure to cocaine. Subsequent findings were neither as striking nor as consistent as the initial observations.

Subjects: One hundred twelve cocaine-exposed mother-infant dyads were matched by ethnicity to unexposed dyads. Each dyad met the following criteria: (1) infant gestational age at 36 weeks or older; (2) no requirement for neonatal intensive care; (3) no obvious major congenital malformations; (4) no diagnosis of fetal alcohol syndrome in their records; (6) the mother was able to speak English; (7) no indication by toxic screen or history of the mother's use during pregnancy of illegal opiates, methadone, amphet-

amines, phencyclidine, barbiturates, or hallucinogens; and (8) mother 18 years of age or older.

Study Design: Drug use was verified by maternal urine samples at recruitment and by infant meconium samples. The Neonatal Behavioral Assessment Scale instrument was used to measure neonatal behavior of infants during the early neonatal period (2 days) and during the third week (17 days) of life in a quiet room. Three in-utero cocaine groups were defined: *heavily exposed*, *lightly exposed*, and *unexposed*. Confounding variables were held constant statistically so that the influence of cocaine could be distinguished from cigarette, alcohol, and marijuana use, birth weight, mother's age, perinatal risks, and obstetric medications.

Findings: At three weeks, after controlling for covariates, a significant cocaine dose effect was observed, with heavily exposed infants showing poorer state regulation and greater excitability. This was not observable in the immediate postpartum period. The effect at three weeks was exacerbated by use of alcohol, marijuana, and cigarettes. Mothers have interpreted poor state regulation as "fussy baby," which may impact the mother-baby relationship. Long-term follow-up studies are needed.

Research reviewed by Deidre Bennett Morrow, RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Larroque, B., Kaminski, M., Dehawne, P., Subtil, D., Delfosse, M., & Querleu, D. (1995). Moderate prenatal alcohol exposure and psychomotor development at preschool age. *American Journal of Public Health*, 85(12), 1654-1660.

Premise: Moderate to heavy alcohol consumption during pregnancy can adversely affect the child's psychomotor development.

Research Question: Can the consumption of moderate amounts of alcohol by pregnant women affect the child's psychomotor development?

Background: Prenatal maternal alcohol consumption in high amounts does affect the development of the fetus, especially the functioning of the central nervous system. The question must be considered for more moderate levels of alcohol consumption.

Subjects: A total of 782 women of French origin who presented themselves to the Roubaix Hospital for obstetric care between May 15, 1985, and January 15, 1986.

Study Design: Women were interviewed about alcohol consumption during their first visit to the maternity hospital.

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Alcohol consumption before and during pregnancy was then assessed with a questionnaire. The psychomotor development of the children was assessed by using the McCarthy scales of children's abilities when they were about 4 years old.

Findings: The consumption of 1.5 oz. of absolute alcohol or more per day during pregnancy was related to lower scores on the McCarthy scale. The study showed that moderate to heavy alcohol consumption during pregnancy has long-term effects on children's psychomotor development.

Research reviewed by Deidre Bennett Morrow, RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Budd, K.W., Ross-Alaolmolki, K., & Zeller, R. (2000). Two prenatal alcohol-use screening instruments compared with a physiologic measure. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 29(2), 129-136.

Premise: Prenatal alcohol screening helps detect early birth defects. Also, reducing alcohol intake as late as the second trimester will result in better birth outcomes.

Research Question: Do the alcohol sensitivity and specificity test of the Prenatal Alcohol Use Interview (PAUI) and ACOG (antepartum record) provide the same test results for substance-abusing pregnant women?

Background: The PAUI used a 13-question instrument and identified women at risk for giving birth to infants with Fetal Alcohol Syndrome. The PAUI uses a questionnaire pertaining to family drinking as well as to personal drinking history. The ACOG record contains information related to past and current pregnancies, medical history (such as the number of alcoholic drinks consumed per day before pregnancy, as well as the number consumed per day after becoming pregnant), and the total number of years of alcohol use.

Subjects: A total of 56 women: 26 drinkers and 30 quitters, ages 18-42 years. Among the subjects, 42% completed high school, 85% were single, and 92% were Afro-American. All were on public assistance.

Study Design: Descriptive. Each woman was given the 13-question instrument (PAUI) and a separate clinic health provider completed each woman's ACOG record. Then, blood for CDT level (type of enzyme found in pregnant women who drink) was collected during clinic visits.

Findings: Women identified as drinkers by the physiologic measure (CDT) were more likely to be identified correctly by the PAUI than the ACOG. The sensitivity of the PAUI is 59% compared to the sensitivity of the ACOG record of

19%. Thus, the PAUI should be used preferentially over the ACOG record for prenatal alcohol screening.

Research reviewed by Aylee Tan, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Devoe, L. D., Murray, C., Youssif, A., & Arnaud, M. (1993). Maternal caffeine consumption and fetal behavior in normal third-trimester pregnancy. *American Journal of Obstetrics and Gynecology*, 168, 1105-1112.

Premise: Long-term maternal caffeine consumption of more than 500-mg. a day can affect fetal behavior.

Research Question: What is the effect of maternal caffeine consumption on fetal behavior in normal third-trimester pregnancy?

Background: Caffeine is nonnutritive and readily crosses the placenta. It also has prolonged metabolic clearance in late gestation.

Subjects: A total of 20 normal pregnant women.

Study Design: This was a longitudinal cohort study. A dietary questionnaire was used to gather information on daily caffeine consumption. Total mean daily intake of caffeine and patient responses were evaluated and conducted by a clinical nutritionist. Pregnant women who ingested more than 500-mg. of caffeine a day were categorized as "high" caffeine consumers (group H). Those who ingested less than 200-mg. of caffeine a day were categorized as "low" (group L). Every two weeks, between 30 and 40 weeks gestation, an ultrasound measured fetal heart rate, fetal breathing, trunk, extremity and eye activity. Each session analyzed fetal state and maternal serum caffeine levels. This study used t-tests or analysis of variance with repeated measures to compare data.

Findings: When compared to Group L fetuses, Group H fetuses spent the most mean time in the arousal state (4F), less mean time in active sleep (2F), and similar mean time in quiet sleep (1F). Group H was significantly higher in levels of maternal serum caffeine levels than Group L. This study concludes that long-term maternal caffeine consumption may affect fetal behavior. The information from this study does not define a "safe" threshold for maternal caffeine consumption.

Research reviewed by Julie Corpuz, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Wisner, K. L., Gelenberg, A. J., Leonard, H., Zarin, D., & Frank, E. (1999). Pharmacologic treatment of depression during pregnancy. *Journal of American Medical Association*, 282(13), 1264-1269.

Premise: Treatment plans that optimize clinical care for depressed women during pregnancy are needed.

Research Questions: Are there medications that can be used safely to treat depression during pregnancy? What are the risks to the fetus/infant during such treatment?

Background: Four studies were selected for inclusion of this research analysis, criteria for inclusion and exclusion were well described. All were published since 1993. Information about the subjects, comparison groups, pregnancy, and birth outcomes were examined and included. The analysis and synthesis processes were well described.

Subjects: Selected studies in which maternal and infant outcomes associated with the use of antidepressants were compared with those of nonteratogen-exposed controls. Four studies completed since 1993 were identified and used in this project.

Study design: Meta-analysis. Information about identifications of subjects, comparison groups, pregnancy, and birth outcomes. The domains of reproductive toxicity, intrauterine fetal demise, morphologic teratogenicity, growth impairment, behavioral teratogenicity, and neonatal toxicity were tabulated.

Findings: Although a limited number of well-controlled studies exists in this area, some current studies suggest that treatment for patients assessed as needing pharmacologic treatment for depression during pregnancy is safe. The researchers examined these specific risk areas and found the following:

- Intrauterine Death—No evidence of increased risk with tricyclics or selective serotonin reuptake inhibitors.
- Morphologic Teratogenicity—No evidence of increased risk of major anomalies with tricyclics or selective serotonin reuptake inhibitors. There may be a slightly higher risk of three minor anomalies (unnamed in this review).
- Growth Impairment—Unclear the degree and significance of weight and length change associated with exposure to tricyclics or selective serotonin reuptake inhibitors in utero because mechanism could be the major depressive disorder itself or the pharmacologic agents.
- Behavioral Teratogenicity—No evidence of cognitive, temperamental, or behavioral change in infants exposed to tricyclics or fluoxetine. No information is available on newer selective serotonin reuptake inhibitors.

- Neonatal Toxicity—Infant withdrawal from tricyclics has been noted (transient jerky movements, seizures, tachypnea, tachycardia, irritability, feeding difficulty, profuse sweating, GI stasis, and bladder distension). Selective serotonin reuptake inhibitors have been reported to produce similar side effects in infants exposed in utero as those noted in adults.

Research reviewed by Debra Lynn Magee, RN, while a student at Virginia Commonwealth University School of Nursing, in Richmond, VA.

B.8. A nontoxic environment, avoiding unsafe levels of air, noise and light pollution, unsafe tap water, chemical hair and skin products, and chemical cleaning agents.

American Academy of Pediatrics Committee on Environmental Health. (1997). Noise: A hazard for the fetus and newborn. *Pediatrics*, 100(4), 724-728.

Premise: Excessive noise is a form of hazardous exposure that may adversely impact fetal well-being and, therefore, needs more definitive study.

Research Question: Is decreased birth weight in infants associated with noise exposure?

Background: Exposure of adults to excessive noise results in noise-induced hearing loss and noise-induced stimulation of the autonomic nervous system, which results in high blood pressure and cardiovascular disease. Collected evidence demonstrates that fetuses and newborns exposed to excessive noise may suffer noise-induced hearing loss and other health effects. This article contains a review of these studies.

Findings: Preterm births were investigated in eight studies: four studies found noise as a risk factor, two studies found no relationship, and two studies were inconclusive. Similar mixed results have occurred while investigating decreased birth weight and prenatal noise exposure. Animal studies on monkeys or rats have found increased stress hormones and subsequent abnormal behavior among those with exposure to noise in utero. There is not enough consistent data to make a definitive statement on the risk to humans, but there is enough data to make randomized controlled studies unethical. Well-designed studies with designs such as matched samples are needed, including following up on infant behavior.

Research reviewed by Deidre Bennett Morrow, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

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Wu, T-N., Chen, L-J., Lai, J-S., Ko, G-N., Shen, C-Y., & Chang, P-Y. (1996). Prospective study of noise exposure during pregnancy on birth weight. *American Journal of Epidemiology*, 143(8), 792-796.

Premise: Noise has been identified as a potential environmental and occupational hazard for women who are pregnant.

Research Question: What is the effect of noise exposure during pregnancy on infant birth weight?

Background: The most common measure used to estimate reproductive outcome in pregnant women living or working in noisy environments is infant birth weight.

Subjects: A total of 200 pregnant women (less than 2.5 months gestation) who were making their first contact with prenatal care. Participants lived in Chia-Yi City, Taiwan.

Study Design: A prospective study. Participants agreed to have a personal noise assessment performed and to be followed throughout gestation. A public health nurse obtained information on the participants' sociodemographic characteristics, past history of pregnancy/abortion, and use of smoking, drugs, or alcohol during pregnancy. Noise exposure of all women was measured during their first trimester (15 weeks), second semester (25 weeks), and third trimester (30-40 weeks) of gestation. Personal 24-hour noise exposure was measured by using a Rion NB13A data logger that was clamped onto the collar of each woman's clothing. Possible exposures to occupational noise (classified by working in a manual job), traffic noise (determined by the measured distance from the subject's house and main streets), and personal exposure to amplified music (whether live or through the use of a "Walkman") was also obtained. Pregnancy outcomes were obtained from medical records 48 hours post delivery.

Findings: Two hundred five births resulted during this study. There were eight twins, one miscarriage, and two stillbirths—all were excluded from further analysis. The mean gestational age was 39.4 weeks and mean birth weight was 3,200 grams. Only nine (4.6 %) infants were below 2,500 grams. The mean of the individual 24-hour exposure in the first trimester was 67.9 (range of 52.4-86.8 dBA_{Leq}). The differences between the second and third trimester measurements of noise exposure were not significantly different. No correlation was found between noise exposure during pregnancy and birth weight.

Research reviewed by Julie Corpuz, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.9. Education and preparation for childbirth, breastfeeding, newborn parenting, sibling readiness, and development of parental consensus and consistency in parenting values and practices.

Bryan, A. A. (2000). Enhancing parent-child interaction with a prenatal couple intervention. *Maternal Child Nursing*, 25(3) 139-144.

Premise: Classes that have content about mutual father-mother role transitions and infant interactions within a couple's relationship can positively affect the parent-child interaction over the first year.

Research Question: What effects do a prenatal-couple group interaction have on postbirth parent-child interactions?

Background: The transition to parenthood is a major developmental change for parents. Many studies have focused on one or the other parent, but few studies have looked at both. Interventions focus mainly on one parent—usually the mother. This presumes primacy of the mother's role and relegates the father's role as one of relative unimportance. This, in turn, may cause conflict between the mother and the father.

Subjects: Participants included 35 test couples and 42 control couples with a mean age of 25 years for the females and 28 years for the males. The sample was drawn from a Midwestern urban area. Among the sample, 96% were Caucasian.

Study Design: Both the experimental and control group couples attended a prenatal educational class series. Then the experimental group took an additional three-class series that focused specifically on parent-infant interactions. Both sets of couples were recorded on videotape to view parent-child interaction at a mean age of 10.5 months.

Findings: The overall findings indicated that the experimental group scores were higher, indicating greater responsiveness to the child than from those in the control group. The test mothers scored higher in sensitivity and the test fathers scored higher on the social-emotional growth fostering. In addition, the experimental couples' mean scores in social-emotional growth fostering were higher.

Research reviewed by Cynthia Allen, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Lumley, J., & Brown, S. (1993). Attenders and nonattenders at childbirth education classes in Australia: How do they differ and their births differ? *Birth*, 20(3), 123-131.

Premise: Women who attended childbirth classes are better prepared for childbirth and child care experiences.

Research Question: Is there a difference in the birth events, satisfaction with care, and emotional well-being of attendees in childbirth classes compared with nonattendees?

Background: Previous studies have shown that, by attending prenatal classes, first-time mothers are more at ease and report having a better delivery experience than nonattendees.

Subjects: A total of 1,193 women who gave birth and had a normal delivery during a two-week period in a hospital in Australia.

Study Design: A postal survey was conducted among first-time mothers. The survey explored areas such as pain relief, satisfaction with care, and knowledge of events.

Findings: No differences were found between the two groups in terms of provision of health care information during the pregnancy. Attendance at childbirth classes did not result in statistically significant differences in the birth events, satisfaction with care, or emotional well-being. The researchers noted that a significant difference existed between the two groups relative to health behaviors such as smoking, consuming alcohol, missed antenatal appointments, and breastfeeding. Nonattendees more commonly had health behaviors known to have adverse effects on fetal development. Nonattendees differed, in general, by being younger, less educated, and single, by having a lower family income, and by having no insurance.

Research reviewed by Cynthia Allen, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Spiby, H., Henderson, B., Slade, P., Escott, D., & Fraser, R. B. (1999). Strategies for coping with labour: Does antenatal education translate into practice? *Journal of Advanced Nursing*, 29(2), 388-394.

Premise: A lack of research exists associating attendance at antenatal classes with decreased psychological stress or increased satisfaction with the labor experience.

Research Questions: To what extent does the teaching of coping strategies in NHS hospital-based evening antenatal classes translate into use during labor? For what proportion of the first stage of labor are coping strategies used? What are women's expectations of help from their midwives and birth companions concerning use of coping strategies in labor? How confident are women about the use of coping strategies and how much effort do they think will be re-

quired for use? How much do women practice coping strategies outside of classes and how satisfied are they with the amount of practice during classes?

Background: Antenatal education provides participants with information regarding processes and choices for labor and infant feeding, an opportunity for supportive networking between participants, and help in learning coping skills.

Subjects: One hundred twenty-one primiparae women whose mean age was 27 years and mean gestation at recruitment was 36 weeks.

Study Design: Exploratory within subjects research design was used and permitted research of the relationship between variables at two time points in the same group of subjects. Participants completed a questionnaire at the fifth antenatal class session, which included questions about confidence in the use of strategies and the amount of effort anticipated. The questionnaire also included hoped involvement of midwife and companion during labor, the amount of coping strategy practice performed outside of class, and psychosocial variables involving beliefs, benefits, and intentions to use coping strategies. Women were interviewed a second time within 72 hours of delivery. Patient labor and coping strategy narratives (the use of the "sighing-out-slowly-breathing" method and Laura Mitchell's method of relaxation and postural change) were recorded. Participants completed a coping strategy/pain assessment questionnaire.

Findings: Results for the use of coping strategies were the following: 88% of the women used the breathing method, 51% used posture change, and 40% used relaxation. Discrepancy occurred between what women wanted midwives to do and their perceptions of midwives' involvement. Birth companion expectations were met: 72% of primiparas stated that the companion encouraged them to start using coping strategies, 90% perceived encouragement to keep using the strategies, and 60% perceived companions did the coping strategies with them. Forty-six percent of the women reported insufficient practice of coping strategies in class, and 84% reported practice of strategies outside of class. Prenatally, few participants had rated themselves as confident in the coping strategies they were learning.

Research reviewed by Theresa Brasler, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Olds, D. L., Henderson, C. R. Jr., Tatelbaum, R., & Chamberlin, R. (1986). Improving the delivery of prenatal care outcomes and pregnancy: A randomized trial of nurse home visitation. *Pediatrics*, 77, 6-27.

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Premise: Education in the form of nursing prenatal home visits has a positive association with better outcomes and stronger support-system building by pregnant women.

Research Question: Can the use of prenatal nurse home visitation improve the health and development of children born to an at-risk group?

Background: Despite previous prenatal care efforts, children's birth weights have continued to be low in this at-risk group of infants.

Subjects: A group of 400 participants, all under the age of 19 years, with no previous live births in a single-parent situation of low socioeconomic status. Ninety percent were African Americans.

Study Design: Participants were randomly assigned to four treatment groups, one being the control group. Level of care began with basic for the second group, increased for the third group, and maximized for the fourth group. Interviews were scheduled at the beginning of the study and again at 32 weeks gestation. Two registered nurses trained to reliability reviewed the hospital assessment tools. A 24-hour diet record and serum cotinine assays were also used as assessment tools.

Findings: All participants were evaluated to insure equality in sociodemographics and health status. The control group had less family involved in the "helping network" ($p = .08$) and a decreased belief that someone would be there with them during delivery. The nurse-visited subjects were more aware of available services, went to childbirth classes more frequently, talked about stressful events more often with their service providers, reported increased attention from their partners, and were more likely to have someone there with them when they delivered. Nurse-visited subjects also had fewer kidney infections. In addition, cigarette smoking decreased in the nurse-visited group. Birth weight was higher (395 grams) than in the nonnurse-visited group and length of gestation was greater in the nurse-visited group.

Research reviewed by Neoma Bower, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

B.10. Communicate with the unborn child through touch, music, singing, and vivid, detailed visualization of the pregnancy, birth, and life you desire with your new child.

Stainton, M. (1985). The fetus: A growing member of the family. *Family Relations*, 34, 321-326.

Premise: Parents ascribe multiple characteristics to their unborn fetuses in considerable detail.

Research Question: To what extent do expectant parents relate to the unborn as a separate, individual family member?

Subjects: A total of 25 expectant couples: 21 were Caucasian Americans, one Canadian, and three Americans with racial backgrounds. Three knew the sex of their unborn. One anticipated a cesarean birth.

Study Design: During the eighth or ninth month of pregnancy, focused, semi-structured interviews were held in the participant's home with both parents present. The subjects were asked general questions about the pregnancy and questions that elicited increasingly specific information about the fetus. Some questions were aimed at differentiating between the "dreamed about" baby and the baby with whom the parents were currently interacting.

Findings: The data were analyzed for recurrent themes and evidence that indicated the parents were experiencing meaningful interaction with the fetus. Parents in the study consistently described their unborn infant in five different categories: 1) appearance, 2) communication, 3) gender, 4) sleep/wake cycle, and 5) temperament. The study showed that parents do develop a relationship with the fetus during pregnancy, and the couples perceived the fetus as a separate person. In general, parents described their relationship with the unborn as a sensitive and intimate one. Mothers especially had a sense of the fetus as an interactive, separate other being with whom they could relate. All couples described the fetus's appearance in relation to color of hair, eyes, etc. Both couples communicated verbally and nonverbally with the fetus and believed they were reciprocated. The infant was thought to communicate distress by excessive kicking, indicating a need for "calming down." Fathers had to work harder to communicate with their infants. First-time parents were more verbally communicative with their unborn child, although not all did so. Parents described their children as sleeping or awake and calm, upset, or alert. Parents often ascribed temperament, and all couples distinguished fetal movement as indicating pleasure or discomfort.

Research reviewed by Judith Ricketts, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Gerhardt, K., & Abrams, R. (1996). Fetal hearing: Characterization of the stimulus and response. *Seminars in Perinatology*, 20(1), 11-20.

Premise: Fetal hearing mechanisms are stimulated by inner and outer sources of noise.

Research Question: How and what can the unborn child hear?

Background: Previous consensus was that a fetus developed in a quiet uterus. More recent research has noted that external noise (speech, the mother's voice, music) stimulates fetal hearing and prompts peripheral response. Newborn babies show a strong preference for the voice of their mothers over that of other male or female talkers.

Subjects: Five pregnant sheep (does not specify the type) with a hydrophone positioned at 45 locations in their abdomen. Previous data show remarkable similarity between humans and sheep.

Study Design: Article reviews a body of experimental evidence gathered from pregnant sheep. Information is presented from numerous referenced studies (i.e., cochlear microphonic levels and sound pressure levels in utero to understand the amplitude of speech sounds detected by the inner ear; ability to discriminate different sounds of speech).

Findings: Exogenous low-frequency sounds below 500Hz penetrate the uterus with little reduction in sound amplification (5 dB). For 500-2000Hz, which are higher sounds, the magnitude of the sound is significantly reduced. A 90dB signal will be reduced by 10dB to 20dB in its passage to the fetus' inner ear. The fetus can detect low-frequency speech and music. Both cochleae are equally stimulated and form one auditory image. It is expected that the human fetus can detect normal conversational voices, but it is unknown whether the fetus can distinguish many of the speech sounds.

Research reviewed by Tina Hill, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Chittacharoen, A., Srihantui, K., Suthutvoravut, S., & Herabutya, Y. (1997). Maternal perception of sound-provoked fetal movement in the early intrapartum period. *International Journal of Gynecology & Obstetrics*, 56, 129-133.

Premise: Assessment of fetal well-being can be determined through maternal perception of sound-provoked fetal movement.

Research Question: Is maternal perception of sound-provoked fetal movement in the early intrapartum period a reliable predictor of fetal condition and perinatal outcome?

Background: Recent studies have tested the maternal perception of sound-provoked fetal movement as an adjunct

to antepartum testing, such as electronic fetal monitoring. This strategy has been found to decrease false nonreactive tests and to decrease testing time and, thus, mother inconvenience and expense.

Subjects: A total of 739 pregnant women (gestational age > 32 weeks, singleton fetus, vertex presentation, latent phase of labor, membrane intact, and signed consent).

Study Design: Prospective descriptive. The study subjects were placed in a semi-reclining position. A maternal feeling of fetal kicking or movement within 5 seconds of applied sound stimulation was considered a positive or normal response. Results of the sound-provoked fetal movement test were related to later results of perinatal outcome.

Findings: Maternal perception of sound-provoked fetal movement was positive in 653 case subjects and negative or suspect in 86. In the groups of subjects with positive responses, perinatal outcome was 100% good. In the negative response group, 15.1% of fetuses had a poor perinatal outcome. The findings support the position that maternal perception of sound-provoked fetal movement is an effective, simple, and inexpensive way of screening fetal health. If studied more extensively and similar results are found, this test would provide a useful clinical screening test. A positive response would be reassuring. The cost of investigating negative responses would likely be cost effective.

Research reviewed by Lori Bloemendaal, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Muller, M. (1996). Prenatal and postnatal attachment: A modest correlation. *Journal of Obstetric, Gynecologic, & Neonatal Nursing*, 25, 161-166.

Premise: Mothers who perceive attachment to their fetus prior to delivery had better parenting experiences with their children and less dysfunctional relationships.

Research Question: Does a relationship exist between how a mother feels toward her fetus during pregnancy and how she feels toward her infant/child as she mothers the infant/child?

Background: An assumption exists that the mother-child unit experiences a more satisfying relationship later if the importance of fostering that relationship is acknowledged and fostered prior to delivery.

Subjects: Of 228 women enrolled, 196 completed this research study. The women were found through childbirth classes in Ohio.

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Study Design: After giving consent, the women who participated received questionnaires that were returned by mail prior to delivery of the expected baby. Follow-up questions were mailed to participants about four weeks after delivery. Tools used in this research study were the Prenatal Attachment Inventory, The Maternal Attachment Inventory, The How I feel About My Baby Now Scale, and The Maternal Separation Anxiety Scale.

Findings: This study found that mothers who feel attached to their fetus before delivery are similarly bonded after delivery. The researchers presumed that prenatal education can facilitate bonding after delivery.

Research reviewed by Caren M. Bennett-Bray, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.