
Research Update

Preterm Birth: A Continuing Challenge

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Abstract

Although preterm birth has been a major focus of study for the past two decades by health care providers in several disciplines, it remains more prevalent in the United States than in many developed countries and continues to be a prime reason for infant death (mortality) and illness (morbidity). In the past 10 years, preterm rates have risen in the United States from 10.6% in 1990 to 11.6% in 2000. Low birthweight rates have increased from 7.0% in 1990 to 7.6% in 2000. This column reviews recent studies addressing preterm and low birthweight births, including changing demographics, the role of assisted reproductive technology, smoking, domestic violence, the experience of women, and treatment strategies.

Journal of Perinatal Education, 11(4), 37–40; preterm births, low birthweight births.

Although preterm birth has been a major focus of study for the past two decades by health care providers in several disciplines, it remains more prevalent in the United States than in many developed countries and continues to be a prime reason for infant death (mortality) and illness (morbidity). This column examines some of the recently published studies that investigate preterm birth.

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Preterm birth (i.e., birth prior to 37 weeks gestation) can be the end result of multiple pathways. In some women, labor begins early for reasons that are sometimes clear, such as multiple pregnancy or infection, or for no apparent reason. Other women experience ruptured membranes prior to the onset of labor and prior to 37 weeks. The health of the mother or the fetus often lead physicians to induce labor early. A fourth group of infants are born after 37 weeks, but they are low birthweight (i.e., the baby weighs less than 2500 grams or 5 pounds, 8 ounces).

In the past 10 years, preterm birth rates in the United States have risen from 10.6% in 1990 to 11.6% in 2000. Low birthweight rates have also increased from 7.0% in 1990 to 7.6% in 2000 (March of Dimes, 2002). What accounts for this increase? One factor appears to be the changing demographics in the population of childbearing mothers. First births to women ages 35 to 39 years more than doubled in the United States between 1970 and 1990, while births to women ages 40 to 44 years increased by 50%. Canada also witnessed sharp increases in first births to mothers over 35 years old.

In a recent Canadian study of nearly 300,000 women who gave birth in Alberta from 1990–1996 (Tough et al., 2002), infants born to women ages 35 years and older were significantly more likely to be less than 37 weeks gestation, low birthweight, and stillborn. A significant increase in multiple births occurred: During the study period, the twin rate increased 28.6% in women over 35 years old. The triplet rate also increased, but reflected only one set of triplets in 1990 and two sets in 1996. Women ages 35 years and older were less likely to have a singleton infant who was small for gestational age. The authors speculate that preterm births in this population of women may be related to maternal complications. However, data about proximal etiology are not available on birth certificates (in Canada, Provincial Notification of Birth); thus, further studies are required to confirm or reject this hypothesis. In an older study that did examine proximal etiology in 4,675 women who were ages 35 years or older and lived in North Carolina (NC), 22% of low birthweight births were associated with medical complications. In the study's younger age groups, the percentage of medical problems ranged from 11.7% for the youngest group (= 15 years old) and increased with every age group to 18.7% for those women 30–34 years old. However, infants who were born at

Young adolescents were significantly more likely to have preterm births.

term but were low birthweight (less than 5 pounds, 8 ounces) were also highest in women ages 35 years and older. This difference may reflect a diversity in population (one-third of the NC sample were African-American), a variation in the period of birth (1984–1987 in the NC sample), or other factors (Moore et al., 1994).

At the opposite end of the childbearing age continuum, adolescent pregnancies, while decreasing each year in the United States, remain at a much higher rate than in many developed nations. Studies of pregnancy outcome in adolescents have varied in their findings; some have suggested increased rates of complications, while others have not found an association between young age and problems. In a recent retrospective review of 14,718 adolescent births and 11,830 births in women over age 20 years, adolescents were divided into two groups: 2,930 younger adolescents (ages 11 to 15 years) and 11,788 “mature” (author's quotations) adolescents (ages 16–19 years). Young adolescents were significantly more likely to have preterm births (Relative Risk [RR] 1.47; 95% Confidence Interval [CI] 1.31–1.64) than women over 20 years old. Older adolescents were only slightly more likely to have a preterm birth (RR 1.04; 95% CI 1.31–1.64), a difference that is not statistically significant (Eura, Lindsay, & Graves, 2002). This study has the advantage of a large sample size. Unfortunately, outcome was not controlled by race, which was significantly different in the three groups ($p < .001$); 90.6% of the young teens were African-American compared to 80.1% of older teens and 63.9% of women aged 20 years and older. The preterm rate of 17.5% in the youngest teens is comparable to the rate of 17.4% for African-American women in the United States in 2000 (March of Dimes, 2002). A re-analysis of these data by race would be useful.

Another demographic difference related to prematurity is an increase of 55% in the rate of twin births, from 18.9 per thousand live births in 1980 to 29.3 in 2000 (Martin, Hamilton, & Ventura, 2001). Increasing maternal age and assisted reproductive technology are two

factors associated with this rise in multiple pregnancies. However, the association between assisted reproductive technology (ART) and preterm birth does not appear to be related solely to multiple gestation.

Schieve and colleagues (2002) studied 42,463 infants born in 1996 and 1997 who were conceived using ART and a comparison group of 3,389,098 infants born in the United States in 1997. Infants conceived with ART and born to mothers ages 20 years and older were 0.6% of infants born in 1997. They represented 3.5% of low birthweight infants and 4.3% of very low birthweight infants, weighing less than 1500 grams (3 pounds, 4 ounces). The risk of low birthweight was 2.6 times that of the general population. An increased risk of multiple births occurred, but infants in multiple births did not have a greater risk of low birthweight than other infants in multiple births (Schieve et al., 2002).

In a study conducted by Perri and colleagues (2001) in Israel, singleton ART pregnancies exhibited a preterm birth rate of 20% compared to a rate of 4–7.3% of births following spontaneously conceived pregnancies birthed at the same hospital. However, in those pregnancies in which the form of ART was intracytoplasmic sperm injection secondary to male-factor infertility, no difference existed in preterm rates following spontaneous pregnancy. The authors suggest that the women with in vitro fertilization may have been secondary to factors such as uterine anomalies, previous abortion(s), and pelvic infections, which are risk factors for both infertility and preterm birth.

Singleton assisted reproductive technology pregnancies exhibited a preterm birth rate of 20%.

Major Risk Factors: Physical Violence and Smoking

Physical violence and maternal smoking during pregnancy have long been recognized as risk factors for prematurity. It is interesting to note similar findings among studies in populations that differ from those in North America and western Europe. A recent study in Saudi Arabia reported a 21% prevalence of physical violence.

Women who experienced physical violence were more likely to have preterm labor, placental abruption, and kidney infections. They were also more likely to experience fetal distress and have cesarean births (Rachana, Suraiya, Hisham, Abdulaziz, & Hai, 2002).

In a retrospective study of 1,194 infants in Japan, the risk of preterm birth was significantly increased if mothers smoked during any trimester of pregnancy (Ohmi, Hirooka, & Mochizuki, 2002). Smoking during the third trimester reduced both birthweight and body length in full-term infants and body length in preterm infants.

Women's Experience with the Onset of Preterm Labor

Three studies in the 1990s indicated that many women who experienced symptoms of preterm labor were initially confused (Patterson, E., Douglas, Patterson, P., & Bradle, 1992), frequently waited from two days to two weeks before seeking care (Mackey & Coster-Schulz, 1992), and sought care only when the symptom pattern increased or changed (Coster-Shultz & Mackey, 1998).

In a study of 30 women with a first experience of preterm labor, Weiss, Saks, and Harris (2002) reported “a marked lack of familiarity with the symptom pattern of preterm labor” (p. 72). They further noted, “Even previous term labor does not provide a good experiential background for recognizing preterm labor” (p. 72); therefore, education must help women identify those cues that will help them differentiate preterm labor from term labor. These authors suggest that the focus on the normalcy of pregnancy and childbirth may divert a woman's awareness from the possibility of adverse occurrences such as preterm labor. Further, they emphasize balancing “the need to demedicalize the normal process of pregnancy and birth with the need to maintain sensitivity among expectant pregnant women of the possibilities of health symptoms requiring their attention and action” (Weiss et al., 2002, p. 74).

Treatment Strategies after Preterm Labor Has Been Identified

The mainstay of treatment for the last two decades has been the use of one or more of several tocolytic medica-

tions. The most frequently used medication has been magnesium sulfate, which many consider contains the fewest side effects. A recently published study by Mittendorf and colleagues (2002), however, found that when 149 mothers were randomized to magnesium sulfate, another tocolytic, or placebo, their infants were more likely to have intraventricular hemorrhage and periventricular leukomalacia diagnosed by cranial ultrasound. Infants whose mothers received magnesium sulfate were also more likely to have cerebral palsy at 18 months of age.

Conclusion

Many questions about preterm birth remain unanswered. While health care providers incorporate current findings into their practices, they can also remain continually observant and raise new questions. A single answer to the prevention of preterm birth is highly unlikely; therefore, the reduction of preterm birth will result from factors evident in multiple research findings. In summary, perinatal education activities that may help reduce the rate of preterm births include increasing expectant parents' awareness of preterm-labor symptoms, fostering smoking cessation programs for childbearing women, and increasing the community's knowledge of the relationship of violence and maternal age to preterm birth.

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