

SMOKING RISKS IN PREGNANCY

During pregnancy, smoking involves a higher risk both for women and their unborn children to suffer serious diseases such as placental cord changes, placenta previa, ectopic pregnancy, intrauterine growth retardation, pre-eclampsia, spontaneous abortion, premature birth, low birth weight, birth defects, congenital urinary tract anomalies, fetal and infant deaths, sudden infant death syndrome, lactation and breastfeeding difficulties, deficiencies in physical growth and neurologic functioning, and altered intellectual and emotional development during early childhood.

Diseases of the respiratory system were most widespread among children born to mothers who smoked, followed by various diseases of the nervous system and the sense organs, then the blood and blood forming organs, the skin and the subcutaneous tissue, and finally, diseases of the genitourinary system. It appears that inherited weakened immune response may partly be responsible for the increased susceptibility to physical malaise found in children born to maternal smokers.

Smoking has a negative impact on pregnancy outcome because in addition to nicotine, cigarette smoke contains carbon monoxide, cyanide, aniline, methanol, hydrogen sulfide, arsenic, lead, cadmium, and 300 other potential toxins or carcinogens. Even though the use of pharmacologic agents raises the concern of fetal damage, nicotine replacement therapy (NRT) is likely to present less risk to the fetus than cigarette smoking. The benefit of using NRT with pregnant women who cannot quit smoking without such therapy substantially outweighs the risks of continued smoking.

Low Birth Weight

Maternal smoking causes an estimated 20% to 30% of all low birth weight deliveries. Children whose mothers smoked during pregnancy are, on average, 200-250 grams lighter and 1 centimeter shorter than those children born to women who did not smoke during pregnancy. Also, these infants born with low birth weight are 40 times more likely to become chronically ill and/or die in their first month of life than are normal birth weight children. There is evidence that the more a woman smokes during pregnancy, the lower her infant's birth weight will be. However, if the pregnant woman quits smoking, the risk of having a low birth weight infant decreases to similar that of a nonsmoking pregnant woman; and, if she gives up smoking by the sixteenth week of her pregnancy, the difference of weight with a nonsmoker's newborn will be unnoticeable.

Increased Mortality

The mortality rate is higher in infants of mothers who smoke than in infants born to nonsmoking women. This applies both to neonatal morbidity and to death between 1 month and 1 year. Also, spontaneous abortion and premature births are almost twice as numerous among smoking mothers as they are among nonsmoking mothers.

Sudden infant death syndrome (SIDS) is the most common cause of mortality in infants between 2 and 5 months of age, and some studies have shown that the relationship between maternal smoking and SIDS is dose-dependent. A pregnant woman who smokes is 2-6 times more likely to have an infant who develops SIDS than a nonsmoking pregnant woman. In addition, it has been found that about 60% of mothers who have lost children to SIDS were smoking during their pregnancy and continued smoking near the infant after the delivery.

Some studies have estimated that mothers quitting smoking during pregnancy might lead to a 10% reduction in all infant deaths and a 12% reduction in death from perinatal conditions. Therefore, nicotine reduction is desirable for pregnant women.

Neurodevelopment

Naeye and Peters analyzed data from a large prospective study to learn whether maternal cigarette consumption during pregnancy would affect childhood mental development. Many confounding variables were controlled by multiple regression analysis and by intrapair comparisons of siblings whose mothers had smoked during 1, but not in the other, of 2 pregnancies. The result showed that hyperactivity, short attention span, and lower scores on spelling and reading tests were more frequent when the mother had smoked when pregnant. This intrapair comparison of siblings offered clear evidence that smoking during pregnancy, independently of any other demographic factors and genetic influences, is a cause of childhood hyperactivity and impaired mental development.

Several other studies have reported an increased frequency of intellectual impairments and behavioral abnormalities in children born to mothers who had smoked cigarettes in their pregnancy. Those include short attention span, a 4-5 month retardation level in reading and mathematical skills, and slightly lower intelligence quotient values as well as various forms of hyperactive behaviors.

Through animal experiments it has been found that carbon monoxide decreases concentrations of brain protein, DNA, noradrenaline, and serotonin, as well as causes a prolonged effect on dopamine turnover during the critical stage of brain development. The above, combined with nicotine-induced fetal brain hypoxemia, has been thought to contribute to the genesis of maternal smoking-associated childhood behavioral abnormalities.

More recently, Law and colleagues conducted a study in Rhode Island aimed at identifying the effects of maternal smoking during pregnancy on newborn neurobehavior. This included an examination of neurologic, behavioral, and stress/abstinence neurobehavioral function. Some of the components they assessed were: active and passive tone, primitive reflexes, attention, arousal, hypertonicity, hypotonicity, lethargy, and number of handling procedures. They used a saliva cotinine measure to confirm maternal self-report of smoking. Cotinine is a chemical made by the body from nicotine and measured in saliva, blood, and urine. While not harmful itself, cotinine serves as a useful biochemical marker for cigarette smoking.

The sample consisted of 27 nicotine-exposed and 29 nicotine-unexposed full-term newborn infants with no medical problems from comparable social class backgrounds. The results showed that the tobacco-exposed infants were more excitable and hypertonic, required more handling and had more stress/abstinence signs (such as decreased duration of sleep between feedings, tremors, increase in respiratory rate, nasal flaring, fever, sweating, excessive sucking, regurgitation, and poor feeding due to uncoordinated sucking). The authors found that the higher cotinine values were related to a higher total stress/abstinence score, more central nervous system stress, more visual stress, and higher excitability scores. They concluded that there are neurotoxic effects on prenatal tobacco exposure on newborn neurobehavior.

Long-term Effects

Butler and Goldstein carried out research to investigate the long-term effects of smoking during pregnancy. They evaluated a national sample in Britain of several thousand children. After collecting comprehensive information about birth weight, gestation, and maternal social and obstetric characteristics, the children were assessed at the age of 7 years with a mathematics test and with a general ability test at the age of 11 years. They also measured height at both ages. The results of the study lead the authors to conclude that children of mothers who smoked 10 or more cigarettes per day are, on average, 1 centimeter shorter. They are also between 3 and 5 months behind on reading, mathematics, and general ability when compared with the offspring of nonsmokers when controlling for other associated social and biological factors.