Pre- and Post-natal Care: Today's Health Frontier

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Full Text: (ProQuest: ... denotes text missing in the original.) At the advanced seminar in clinical ecology held in November, 1983 at Colorado Springs, Colorado, Jonathan Maberly, M.B., M.D., of Yorkshire, England stated that the most critical period of life is from three to six months preconception through the first year. However, because rapid brain growth and immune system maturation take place during the first two years of life, we would extend the "critical period" an additional year. The purpose of this article is to establish a credible basis for Dr. Maberly's claim. From three months or so preconception through the two-year period following birth, fundamental events in biological development occur. As Dr. Maberly reported, the sperm of the male begins to divide and form at three months preconception. During cell division (mitosis), the sperm gets ready for fertilization. Any damage to a person at this point can affect mitosis. During cell division, cells are especially vulnerable to damage, whether from toxins, radiation, or malnutrition. In the female, egg cells develop during the four weeks before ovulation. In the two weeks immediately preceding ovulation, mitosis takes place rapidly. Both men and women must be as healthy as possible at least three months before conception in order to produce healthy children. In experiments conducted with rats, the importance of preconception health was investigated. When vitamin deficiency was induced in laboratory animals at 14 days preconception, the majority of the rats were born dead or abnormal. If the deficiency was induced earlier than 14 days, the rats were born sterile. Supplementing the diet after conception did not make the slightest difference. Nutrition deficiency two weeks before ovulation produced impaired T-cell function in the offspring. The immune deficiency persisted for at least two generations. Animal experiments suggest that morphological changes occur in mature sperm cells after a single large dose of alcohol. In these experiments, sperm cells failed to ascend in the Fallopian tubes; also, ovulation tended to be inhibited.1 These findings, in animals, can be important to humans. Physiologic Influences During Pregnancy The next important phase is that of the first trimester of pregnancy, a period of three months or so following conception, during which the organ systems of the fetus, including the immunologic system, are formed. Exposures to drugs, toxins, or infection (especially German measles, or rubella) during this period may result in congenital malformations and/or impaired organ function. Durihg the first trimester of intrauterine life, growth is achieved through cell division. Although the embryo multiplies to many times its initial weight through this mechanism, it reaches less than 10 percent of its final birth weight at this time. In contrast, the remaining portion of gestation is characterized by a relatively slower rate of cell division along with depositions of fat, water, and intracellular substances. Whereas the peak velocity of length growth appears about the middle of pregnancy (the 20th week), weight increase shows its maximum rate by the middle of the third trimester (approximately 32nd week). Based on these data, it can be calculated that the fetus reaches approximately 71 percent of its ultimate length by the 28th week of gestation while weight has reached only 32 percent of birth weight. Why is this important? In practical terms, fetuses that experience insults early in pregnancy, such as chronic nutritional deficiencies, smoking, infections, or vascular alterations that result in a reduction of the placental blood flow, exhibit both a reduction in length and weight growth. If the insult begins after the 28th week of gestation, it produces weight retardation, but less damage will be evident in length growth.2 The next major event is labor and childbirth. Thanks to modern obstetrical care, dangerous infections of earlier times are seldom seen today. The major hazard of childbirth for the fetus is cerebral anoxia (lack of oxygen) as a result of obstetrical complications. Of all the tissues and organs of the body, the brain and nervous system are the most susceptible to damage from anoxia, which may become evident in later life in the form of

learning disabilities and other neurologic disorders. Dangers of Malnutrition and Toxins Following Birth Following birth, a spurt of brain development continues for about 30 months.3 During this time the brain normally develops a large portion of its adult weight. Malnutrtion during this time may result in an impairment of brain development. The human newborn comes into the world with a relatively undeveloped immune system. The lymph nodes are small, plasma cells are sparse in the bone marrow, and immunoglobulin synthesis is low. Normally, soon after birth, the infant begins to respond to multiple antigenic stimuli from bacteria on or in the skin, the bowel, and the respiratory tract, as well as from microbial and parasitic infections. If the immunologic system is normal, the immunologic experience is reflected in gradual growth and development of these parameters of the immune system. Until such time that the child achieves adult levels of immune capabilities, it is probably uniquely vulnerable to damaging effects of malnutrition, toxins, or immunologic insults which may stunt or impair the developing immune system. Major Hazards to the Unborn Child What are the major hazards in today's society for the developing fetus? They include toxic chemicals from environmental pollution of air, food, and water; malnutrition (sometimes from poverty, but more often from faulty choices in food); alcohol, tobacco, and drugs; and other factors. At this point, it is appropriate to cite some of the available information on pregnancy outcomes and on health trends in today's children which presumably reflect the cumulative effects of these various factors. Childhood mortality has markedly decreased because of advancements in medical care. In 1930, 65 of 1,000 babies born alive died before their first birthday. In 1950, the rate was less than half that: 29 per 1,000. In 1979, the rate decreased to 12.7 deaths per 1,000 live births.4 Based on vital statistics from the Health Data Center, Department of Health, Commonweath of Pennsylvania, fetal death rate has dropped from approximately 24 fetal deaths per 1,000 deliveries in 1942 to less than 20 fetal deaths in 1982. Presumably, these Pennsylvania statistics reflect trends throughout the nation. Also, there has been no increase in the incidence of birth defects for the vast majority of the 150 known types of structural malformations.5 What of the incidence of miscarriages (spontaneous abortions)? Has this rate increased in recent decades as a result of environmental pollution and other risk factors listed above? Statistical trends are difficult to evaluate in regard to the incidence of miscarriages, but the overall incidence appears to range from 8 to 15 percent,6 7 which probably does not represent an increase compared with earlier times. However, alcohol8 and anesthesia gasses9 have both been related to increased miscarriages. One study showed no relation between cigarette smoking and miscarriages, although birth weights were lower when the mother smoked during pregnancy.10 In this same study, there was no increase in miscarriages in laboratory workers exposed to solvent fumes. In other words, there do not appear to be major trends toward increasing birth defects, fetal deaths, or miscarriages resulting from modern technologic society and chemical environmental pollution. Subtle Neurologic Alterations If there is fetal damage from these factors, we must look for it in other expressions and changes in the health of today's children. What are these changes? Although meaningful statistics are difficult to establish in health trends, there are strong indications of an increased incidence in children of subtle neurologic alterations, mainly expressed as learning disabilities along with behavioral disorders, and an increase of allergic and immunologic problems.1113 Much of the data on which these conclusions are based have been generated by the National Health Interview Survey, a federal program mandated by Congress that, since 1956, has conducted continuing interviews with residents of thousands of households throughout the country. According to this survey, theproportion of children with some limitation of activity has doubled over the last two decades. The degree of limitation of activity varies from those who are unable to attend school to those who must attend special schools to those who attend regular schools but are limited in their ability to participate in sports and other recreational activity.11 This increase in disability primarily involves visual and hearing impairments as well as asthma.12 It also involves learning disabilities.13 As a sample of reports on this subject, one study reported an alarming rise in atopic eczema in Great Britain. Of a group of 12,555 children born in a single week in 1970, 12 percent were reported by their parents as having had atopic eczema by the age of five years, more than twice the proportion reported in a similar study earlier.14 As pointed out in a New York Times article: The number of students

identified as learning disabled has increased substantially since 1975, when Congress passed the Education of All Handicapped Children Act requiring public schools to provide services for handicapped youngsters, including the learning disabled. According to the United States Department of Education, 1.8 of the 40 million elementary and high school students are now being served, more than double the 1976 figure of 800,000. During the same period, students identified as learning disabled also doubled, from 22 percent to 43 percent. In part, the growing numbers reflect changes in how students are classified . . . New research is establishing links between learning disabilities and juvenile delinquency. The National Council for Juvenile Court Judges estimates somewhere between half and three-quarters of delinquent children are learning disabled.15 It is extremely difficult to ascertain the extent to which these increasing disabilities are due to cogenital and/or prenatal influences or to those influences that occur following birth. The difficulty was outlined in an editor's note in the New York Times, commenting on a study conducted by Dr. Peter Budetti: Dr. Budetti said that over the last 25 years there has been a doubling of the number of children under 17 years of age who have been limited in their activities by chronic conditions. But he said it had not been determined when these health conditions first occurred because certain activity-inhibiting diseases can be contracted after a child has begun to grow. A large share of the increase in childhood health problems was accounted for by such debilitating conditions as chronic bronchitis and asthma. Some children might, in fact, be born with a disposition toward developing these debilitating conditions later in life, but the conditions themselves are not considered to be birth defects as such. Learning disabilities, which are classified as being among the increased health problems, are not usually identified until after a child enters school. They are not, therefore, classified as birth defects, although it is known that in some cases their causes occurred before the child was born. 16 Conclusion The trend toward childhood disability is increasing. There are suspicions but little proof that this trend has its origin in adverse prenatal influences, including malnutrition, environmental toxins, and other harmful factors. Prenatal care has been and remains the stepchild of modern medical science, the object of relative neglect. As modern science is compelled by this emerging trend to devote more time and effort to a study of the vital prenatal period, there will be a gradual realization that prenatal care, together with health-oriented postnatal care, represents the most important aspect of health care today, at least from the standpoint of future generations. References References 1. Newman, N.M. and Correy, J.F., Effects of alcohol in pregnancy. Medical Journal of Australia, July 12, 1980, 5-10. 2. Villar, Jose and Belizan, J.M. Growth and development of intrauterine growth-retarded infants. Clinical Nutrition, 3(6): 1984. ...in Effects of Obstetrical Medication on Fetus and Infant. Monographs of the Society for Research in Child Development, 35(4): 1970. CRM Films, "Prenatal Development," New York: McGraw-Hill Films, 106635-5. DeMause, L., Foundations of Psychohistory. New York: Creative Roots, Inc. Edwards, M., Teenage Parents. Seattle: The Pennypress, 1978. Feher, L., The Psychology of Birth. 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