Women's Health: Pregnancy and Childbirth

Prenatal Risk Factors for Mental Retardation in Young Children

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Synopsis ....

In a prospective study, prenatal risk factors for mental retardation were identified in two large samples of white and black children followed from gestation to age 7 years in the Collaborative Perinatal Project. Important antecedents of severe and mild retardation include both characteristics of the family and complications of pregnancy.

For the severely retarded, a higher frequency of maternal seizures was a major discriminator in comparisons with higher IQ groups. For a subgroup of the severely retarded that was free of major neurological disorders, maternal urinary tract infection in pregnancy was an important independent risk factor.

Major prenatal discriminators between the mildly retarded and children at higher IQ levels were indices of maternal intelligence, education, socioeconomic status, and amount of prenatal care received.

These and other risk factors found in the samples studied suggest preventive strategies that could reduce the incidence of cognitive deficit in children.

A MAJOR GOAL OF THE LONGITUDINAL Collaborative Perinatal Project of the National Institute of Neurological and Communicative Disorders and Stroke was to investigate prenatal and perinatal causes of mental retardation (*1*). This report summarizes the prenatal risk factors identified for severe and mild retardation in 17,000 white children and 19,000 black children who were followed from gestation to age 7 years (*2*). Based on IQ tests individually administered at age 7, approximately 0.5 percent of children in each sample were found to be severely retarded, with IQ scores under 50. One percent of children in the white sample and 5 percent in the black sample were mildly retarded with IQs between 50 and 69.

The basic design of this investigation of antecedents and correlates of mental retardation was to compare each retarded group to groups of children at higher IQ levels within each sample. There were four comparison groups for the severely retarded—the mildly retarded, the borderline, the average, and the above average. Mildly retarded children were compared with the latter three groups.

The prenatal factors examined in this study include family and maternal characteristics as well as events in pregnancy. Of the 64 characteristics screened, 44 had values in the severely or mildly retarded groups, or both, that differed significantly (*P* < .05) from those in a higher IQ group. These variables were entered in two-group discriminant function analyses to identify the independent differences between retarded and nonretarded groups (*P* < .05) in the white and black samples.

The most important prenatal discriminators between the severely retarded and children at higher IQ levels were socioeconomic status of the family, seizures in pregnancy, maternal education, and maternal score on the SRA (Science Research Associates), a brief test of nonverbal intelligence. The three demographic-maternal variables had highly similar nonlinear relationships to IQ level. The socioeconomic index, a percentile score based on occupation and education of head of household and family income, was higher for the severely retarded than the mildly retarded or, among whites, the borderline group, but lower than for the average or above average groups. Mean scores were higher among whites than blacks in all IQ groups.

Similarly, a higher level of maternal education discriminated between the severely retarded and the mildly retarded and borderline groups among whites. In both samples, the level was significantly lower than in the average or above average group. Moth-

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ers of the severely retarded had lower scores on the SRA than did mothers of the average and above average children in both samples. In the white sample, retardation in siblings, reported in a prenatal interview by mothers of more than 15 percent of the severely retarded, was a discriminator in comparisons with the borderline, average, and above average groups. Among blacks, characteristics related to severe retardation were lower birth weight of the previous child, a factor significant in comparisons with all nonretarded groups, a higher frequency of fetal or neonatal death as outcome of the last pregnancy, and less maternal employment in the prenatal period.

Events in pregnancy related to severe retardation included seizures, a highly significant factor, which were reported in prenatal interviews by more than 3 percent of mothers of the severely retarded, discriminating between them and the average and above average groups among whites, and the mildly retarded, borderline, and average groups among blacks. In the white sample, weight gain in pregnancy among mothers of the severely retarded was lower than in all other IQ groups and these mothers had made significantly fewer prenatal clinic visists than mothers of the average and above average children. The frequency of rubella in pregnancy was relatively high (2 percent). Hospitalizations early in pregnancy and the complication of anemia discriminated between the severely retarded and the above average among whites. Significant pregnancy complications in the black sample were rheumatic fever, which affected 1 percent of mothers of the severely retarded and, considerably more frequent—toxemia—present in 17 percent versus 9 percent of mothers of average children.

As indicated by the summary canonical correlations, prenatal factors were most effective in discriminating between the severely retarded and above average black children (R = .56). In the white sample, they were equally effective in discriminating between the extreme IQ groups and the two retarded groups (R = .36 and .34). Many of the prenatal factors related to severe retardation were also related to mild retardation. Exceptions were the pregnancy complications of seizures, low weight gain, rubella, and rheumatic fever.

Major discriminators between the mildly retarded and higher IQ groups in the prenatal period were indices of maternal intelligence, education, socioeconomic status, and amount of prenatal care. Values for each of these variables increased linearly across IQ level from the mildly retarded to the above average. In both samples, mothers of the mildly retarded had lower scores on the SRA than did mothers of children in the three higher IQ groups. Less maternal education and lower socioeconomic index scores discriminated between the mildly retarded and all higher IQ groups except for the borderline one among whites.

Other demographic and maternal characteristics of the mildly retarded common to both samples were higher housing density, higher maternal parity, a higher frequency of self-reported maternal retardation, and, as compared with the average and above average groups, shorter maternal stature.

In the white sample only, mothers of the mildly retarded reported an age at menarche that was signficantly older than in any other IQ group. Maternal reports of retardation in the fathers and in the older siblings of the mildly retarded were significant in the average group comparison. In the black sample, three characteristics of reproductive history were related to mild retardation: a shorter pregnancy-free interval, lower birth weight of the last child, and a higher frequency of prior fetal deaths.

Pregnancy risk factors for mild retardation which were significant in both samples were fewer prenatal visits, as mentioned, and more hospitalizations early in pregnancy. Among whites only, higher frequencies of urinary tract infection, anemia, and the relatively rare complication of toxoplasmosis (2 percent affected) characterized mothers of the mildly retarded. In the black sample, a lower hematocrit in pregnancy, one criterion of anemia, discriminated between mothers of the mildly retarded and those of children in all higher IQ groups. Other significant pregnancy complications were higher frequencies of toxemia, heart disease, and unspecified bacterial infection.

Prenatal characteristics, especially maternal and demographic ones, were effective discriminators between the mildly retarded and the above average (R values of approximately .60). Among blacks, they were moderately effective in differentiating between the mildly retarded and average children (R = .29).

Returning briefly to severe retardation, among

whites, mothers of children with IQs under 50 but without major neurological signs had a significantly higher frequency of urinary tract infection during pregnancy (40 percent) than mothers of severely retarded children with neurological abnormalities (5 percent) or those of children with IQs in the border-line, average, or above average ranges, where the frequency of this complication decreased linearly from 21 percent to 9 percent (2, 3,). A discriminant function model was used to investigate the independent contribution of maternal urinary tract infection to this subtype of severe cognitive deficit. Of the 92 children in the white sample with IQs under 50, 26 were free of major neurological abnormality. The prospectively ascertained pre- and perinatal characteristics of this group were compared with those of the neurologically abnormal severely retarded children, and with those of a large group of normals with IQs in the average range of 90 to 119 ($N = 12,667$). Maternal urinary tract infection during pregnancy was a significant independent discriminator in both comparisons.

Mothers with urinary tract infections may also have endotoxemia, which, in turn, can cause fetal damage. Within the Collaborative Perinatal Project population, this pregnancy complication has been related to low birth weight (4), excess perinatal deaths (5), and to fetal leukoencephalopathy in infants who died in the first month of life (6, 7). The present findings are based on a small sample, but they suggest that maternal urinary tract infection is a significant risk factor for severe cognitive deficit in children.

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Issues and Concerns of Healthy Pregnant Women

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Synopsis ....

The issues and concerns of the 85 percent of essentially healthy women who have normal pregnancies and births are reviewed. The importance of their issues in relation to their health care and outcomes is discussed.

THIS DISCUSSION CONCERNS the approximately 85 percent of essentially healthy women who have normal pregnancies and babies. In reviewing the report of the Public Health Service Task Force on Women's Health Issues, however, very little was found on the issues of concern to these 85 percent of pregnant women. This discussion, then, takes the form of an overview of these issues and concerns and selected studies and references which address them.

The demographics of the 85 percent vary widely across the socioeconomic spectrum. Included is the lower socioeconomic, the so-called "clinic" population, who largely have fewer years of formal education. The 85 percent also includes the middle and upper socioeconomic, educated consumer population. The 85 percent range in age from the young adolescent to the over-30 elderly primigravida. These two diverse groups, and all those in between