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The care of premature infants in most nurseries entails prolonged physical separation of a mother from her baby. To determine whether this period of separation results in altered maternal behavior we measured feeding performance in a group of mothers who were permitted physical contact with their premature infants (mean b.w. 1,551 g) beginning in the first days of life (Early Contact). Their feeding behavior was compared at the time of discharge and one month later with another group of mothers who first handled their babies (mean b.w. 1,409 g) after 20 days of age (Late Contact). We made 34 time lapse movies of 24 mothers feeding their infants. Mothers' and babies' reactions were analyzed in detail at 1-sec intervals for 10 min of each 15 min filmed. Each frame was scored for twenty five activities ranging from caretaking skills such as the presence of milk in the tip of the nipple to measurements of maternal affection, such as the mother's body touching the infant's trunk (cuddling). Although the amount of time the mothers were looking at their babies was the same in both groups, the Early Contact group had significantly greater 'en face' (mothers' face rotated so that her eyes and those of the infant meet fully in the same vertical plane) 14.8% vs. 5.7% ($p < 0.05$) and also more cuddling 46.3% vs. 21.1% ($p < 0.025$) in the pre-discharge but not the one month feeding. Both of these reflect to some extent the active interest of the mother in her infant. There were no significant differences in measures of caretaking. It is intriguing to consider whether the differences in maternal behavior are due to early initiation of physical contact.

151 *Health of the American Indian: Papago Children.* MORTON S. ADAMS and JERRY D. NISWANDER, Univ. of Rochester, Rochester, N.Y. and Nat. Inst. of Health, Bethesda, Md. (introduced by Philip L. Townes).

The health of the American Indian is a matter of increasing concern. The availability of extensive lineage records, the preservation of traditional cultural factors and the relative absence of miscegenation characterize the Papago tribe of southwestern Arizona. A complete cohort of 134 full-blooded Papago children born between July 1965 and December 1967 and living on reservation were studied with their families. In addition over 900 school children from all parts of the reservation were examined.

The survival of the Papago is dependent upon cultural patterns adaptive in the arid environment of the Southwest. However, this culture carries with it other, less desirable, consequences including (1) a high frequency of several congenital malformations (myelodysplasia and microphthalmia) due to endogamous marriage practices, (2) high mortality and morbidity from infectious disease, (3) normal perinatal development followed by growth retardation, and (4) the early onset of obesity and a high frequency of diabetes mellitus.

This study has suggested modifications of the health care system more compatible with the cultural setting which will lessen the adverse impact of these adaptations on Papago children.

152 *The Offspring of Alcoholic Mothers.* CHRISTY ULLELAND, RICHARD P. WENNBERG, ROBERT P. IGO and NATHAN J. SMITH, Univ. of Washington Sch. of Med., Seattle, Wash.

Maternal chronic alcoholism was associated with 41% of infants who were born undergrown for gestational age at King County Hospital during the past two years.

In order to assess the risk of maternal alcoholism on the outcome of pregnancy and subsequent development of the infant, the offspring of 11 alcoholic mothers were followed closely in a special clinic.

Twelve infants (one set of twins) were studied. Ten infants (9 mothers) were undergrown for gestational age (range 34-40 weeks). Except for poor maternal diet, lack of prenatal care (7 mothers), and premature delivery (4 mothers), pregnancies were apparently normal. Five mothers were 35 years old or older. Six were Indian, four Caucasian, and one Negro. Detailed nutritional histories from 7 mothers indicated that 5/7 had deficient diets during pregnancy, 2 of which were severely deficient in both calories and protein.

Eight infants failed to grow, with weight and head circumference remaining below the third percentile. Six of the eight were receiving adequate diets at home for growth, and two infants with a history of poor diet failed to grow normally when hospitalized. Gesell or Denver developmental evaluations were administered to 10 infants. Two were normal, three suspect, and five clearly had retarded development.

These observations indicate that infants of alcoholic mothers are at high risk for pre- and post-natal growth and developmental failure, and suggest that greater attention should be given to alcoholic women during the child bearing years.

153 *A Three-year Follow-up Study of Abused and Neglected Children.* STANFORD B. FRIEDMAN, CAROL W. MORSE and OLLE JANE Z. SAHLER, Univ. of Rochester Med. Center, Rochester, NY.

From 1963 to 1965, 26 children from 24 families were identified as victims of physical abuse or gross neglect. 25 of these children (23 families) were located 2 to 4⁵/₁₂ years (median = 2¹¹/₁₂) following the incident of abuse. For 21 children, a parental interview was conducted and the child's physical and behavioral status was assessed. In all cases, information regarding each child was obtained from local hospitals and emergency departments, physicians, protective and other community agencies, and when appropriate, from schools. 1/3 of the children again had been subjected to abuse or gross neglect, even though 5 children had not been returned home following initial hospitalization. 70% of the children were judged to be developmentally retarded, though often mental retardation or hyperactivity was thought to have preceded the abuse. One or both parents in 18 families exhibited emotional disturbance and/or mental retardation. These and other factors result in a situation in which a child may be identified as being vulnerable to further abuse, and placement outside the home must be considered. Of the methods of intervention examined, the approach of the public health nurse was judged to be most successful.

154 *Psychological Sequelae to Bacterial Meningitis: Two Controlled Studies.* SARAH H.W. SELL, WARREN W. WEBB and JOHN E. PATE, Vanderbilt Univ. Sch. of Med. (introduced by David T. Karzon).

There is a growing suspicion that survivors of bacterial meningitis have deficits which may not become apparent until the children encounter the stress of school. Controlled studies are needed to evaluate such subtle sequelae.

The first study concerns the intelligence test results of 21 influenzal meningitis survivors, each of whom was paired with a near age sibling. All patients were ill before the age of 3, during 1960-64. All were tested at age of 6 to 15 years. The mean IQ of the postmeningitic (PM) children was 85 while that for sibling controls (C) was 97 ($p = 0.04$). It was found that 6 of 21 (29%) of the PM subjects were 15 IQ points (1 S.D.) and 2 (10%) were more than 30 IQ points (2 S.D.) lower than C while no C had an IQ which was 15 points below that of his affected sibling.

The second study compares psychological test performance of 25 post-bacterial meningitic children, considered to be free of sequelae, who were enrolled in regular public school classes in the first 3 grades. Each was matched by age, sex, social class and classroom membership with a peer control. All subjects were administered a battery of psychological tests. The results indicated that with each of the following, the PM subjects had significantly lower mean scores than peer controls. On the Illinois Test of Psycholinguistic Abilities, the psycholinguistic ages differed at the 0.004 level. On the Frostig Developmental Test of Visual Perception, the perceptual quotient differed at the 0.08 level. On the Peabody Picture Vocabulary Test, the vocabulary quotient differed at the 0.03 level.

It is concluded that these survivors of bacterial meningitis function intelligently at a significantly lower level than their sibling or peer controls.

155 *Psychosocial Study of Childhood Poisoning: A Five-year Follow-up.* JAMES A. MARGOLIS, Univ. of Washington Sch. of Med., Seattle Wash. and Yale Univ. Sch. of Med., New Haven, Conn. (introduced by Albert J. Solnit).

Fifty-two families were involved in a retrospective study of childhood poisoning in 1963. The study population consisted of 20 poison repeaters, 19 single ingestors and 13 controls and their families. The data indicated that childhood poisoning was the result of an abnormal parent-child interaction characterized by behavior problems in the child, limited parent-child relatedness, marital tension and a tense and distant family atmosphere.

The present study was undertaken to determine if these children and their families could still be differentiated by psychosocial variables, 5 years after the initial study and 7 to 10 years after the poisoning episode.

During the interim none of the subjects ingested poisons, nor did their siblings and there was not a shift to other types of accidents. Poison repeaters were continuing to have more behavior problems than single ingestors and they in turn were more deviant than controls. The families could not be differentiated socioeconomically, but there continued to be more stress in the homes of the poisoned subjects, especially therepeaters.

In conclusion, childhood poisoning, especially when repetitive was found to be related not only to behavior problems of the child and family maladaptation at the time of the ingestions, but also significantly predicts later problems in the child and his family. The present study offers further evidence that childhood poisoning is more than just a chance event and may be the result of a pathological parent-child relationship that has long lasting consequences requiring early intervention.

156 *Unmet Needs of Parents of and Individuals with Sickle Cell Anemia (SCA).* CHARLES F. WHITTEN and JOYCE KIRKLAND, Wayne State Univ., Detroit.

Interviews with 50 mothers of children with SCA and 50 adults with SCA reveal that too frequently: (1) Parents believe that their children will not live beyond the teens. (2) Children are pressured to eat 'blood building foods' to improve the anemia and life expectancy. (3) Children's physical activities are unduly restricted. (4) Parents nor children know how to cope with the child's small stature or the teasing it engenders. (5) Parents are not aware that the annoying enuresis may be secondary to SCA. (6) The child's feelings about the disease are not even explored. (7) Parents and adults have uncertainties about the desirability of sicklers marrying and having children. (8) Prior to the birth of a child with SCA parents are not aware of their potential for having children with the disease. (9) One parent blames the other for the child's SCA. (10) Teenagers and adults do not seek training in sedentary occupations. (11) Employers reject applicants with SCA for jobs within their capabilities. These undesirable features appear to exist because: (1) Physicians have not informed, have inadequately informed, or have inaccurately informed sicklers and their parents, or physicians have not used a mode of presentation which promotes understanding and retention, (2) genetic, occupational and psychological counseling have been neglected, (3) employers have not been informed that with a few allowances sicklers can be successful employees. Thus, we need to develop a multidisciplinary public education and anticipatory guidance program. This could significantly improve the lives of many victims of SCA and their parents by enabling them to make realistic and healthy social and psychological adjustments.

157 *Correlation Between Plasma and Liver Concentrations of Vitamins A and E in Patients with Cystic Fibrosis (CF).* BARBARA A. UNDERWOOD and CAROLYN R. DENNING, Inst. of Nutrition Sci. and Dept. of Ped., Columbia Univ. Coll. of Physicians and Surgeons, New York, NY.

This study was designed to determine if the low plasma concentrations of vitamins A and E often seen in children with CF are a reflection of tissue depletion or of a defect in transport mechanisms. Ten patients with CF, ranging in age from 9 to 23 years, were studied. Plasma concentrations of vitamins A and E and carotene were measured in 7 of the 10 patients during the 18 months prior to death. At autopsy all 10 subjects had repeat measurements of these parameters plus an assessment of liver concentrations of vitamin A and α -tocopherol. All patients had received regular supplementation with vitamin A at twice the recommended daily allowance for several years; however, plasma levels of this vitamin were consistently below normal and carotene values were remarkably low in all subjects. Nine of the 10 CF patients had normal or increased vitamin A concentrations in the liver. Eight of the 10 patients received no supplemental vitamin E and had plasma vitamin E levels less than 0.4 mg/100 ml and liver concentrations of α -tocopherol less than half that of the control group. This study has shown that the low plasma concentrations of vitamin A in patients with CF do not reflect inadequate liver stores and suggests a defect in the mechanism by which vitamin A is transported from its storage depot in the liver. In contrast, the low plasma concentrations of vitamin E do correlate with decreased liver stores of α -tocopherol. (Supported by grants from the National Cystic Fibrosis Research Foundation and the Nutrition Foundation.)