

EARLY DIET IN CHILDREN BORN PRETERM AND THEIR INTELLIGENCE QUOTIENT AT THE AGE OF EIGHT.

INTRODUCTION

A

It has been hypothesized that early diet influences the development of the central nervous system in children born preterm. It has been shown that at 18 months of age, neuromotor development as assessed by the Bayley test was associated with early diet. Children who were fed special preterm formula (typically having a higher protein and energy content) had higher test-outcomes than children fed term formula (Lucas, 1990); children whose mothers chose to provide breast milk had higher test-outcomes than those whose mothers chose not to (Morley, 1988). Follow-up of about the same group of children also showed an association of the intelligence quotient (IQ) at 7 to 8 years of age with early diet: the mother's choice to provide breast milk was associated with higher IQs. Also after adjustment for the mother's education, social class, days of ventilation, and gender, this association was still present (Lucas, 1992).

B

Plausible mechanisms explaining the association between early diet and neurodevelopment exist. It is known that especially in the last term of the pregnancy the brain develops and entrainment by various maternal stimuli occurs. However, in children born preterm this maturation is stopped abruptly and the last part of the neurodevelopment now has to take place outside the safe environment of the uterus, and in the presence of environmental stress. Clearly, the care for these children has many sides and an appropriate diet is one of them. Ideally, the food given should not burden the immature gastro-intestinal tract, but supply the infant with absorbable, essential nutrients to grow and mature the neurologic system (not necessarily equivalent).

An important issue, which has been addressed marginally in the studies on the relation between early diet and neurodevelopment is the possible role of gestational age. It may well be that the effect of early diet is different for children born at different gestational ages since the maturity of the gastrointestinal tract and the need for certain nutrients may differ. In this study we addressed this question for children born at a gestational age ranging from 26 to 38 weeks, and weighing less than 1850 g. The children received mother's milk at various quantities depending on the mother's capability to produce enough milk to meet the children's need.

STUDY DESIGN

Study population

Data were taken from an existing study on the feeding of preterm infants. In 1982, the study started as a prospective randomized multicentre study in which random assignment to several possible feeding regimens in a cohort of 926 infants was accomplished. Babies under 1850 g at birth, admitted to the special-care baby-units in Cambridge, Ipswich, Kings Lynn, Norwich and Sheffield, between January, 1982, and March, 1985, were entered into the study. Mothers chose whether to provide breast milk for their infants within 72 hours of delivery. Infants were studied in the postnatal period until they left the neonatal unit (go home, being transferred to a non-trial unit, or die), or when they reached 2000 g, whichever was sooner.

Baseline data collection

Birthweight and gestational age were recorded. The ratio of the birthweight to the mean reference weight using the current British normal values for gender and gestation, was calculated.

As an indicator of 'early diet' the proportion of enteral intake as mother's milk during the time the children were in the study was taken. This proportion was calculated as a volume percentage of total enteral intake. If children received only parenteral feeding their percentage would typically be missing.

Social class was coded with the Registrar General's classification based on occupation of the income-providing parent or on father's occupation if both parents were earning, and with class III subdivided into non-manual and manual.

Mother's education was coded as follows: no educational qualifications (1); up to four passes for the certificate of secondary education (CSE) (2); any general certificate of education (GCE) at ordinary (O) level or more than four CSEs (3); any GCE at advanced (A) level (4); and degree or higher professional qualification (5).

Birth rank was defined as the child's birth order in the surviving children of the family, with infants from multiple births being assigned an equal rank.

Smoking status of the mother was also recorded (yes/no).

Follow-up

At the age of 7 to 8 years, the Intelligence Quotient (IQ) was assessed with the Weschler Intelligence Scale for Children (revised Anglicised version WISC-R UK). Because extensive additional data were

collected, an abbreviated version of the Weschler Intelligence Scale for Children -Revised was used. This scale has 5 sub-sets: similarities, arithmetic and vocabulary (verbal scale), and block design and object assembly (performance scale). Weschler Intelligence Scale for Children - Revised IQ assessed from these five sub-scales has a correlation coefficient with the full Weschler Intelligence Scale for Children-Revised IQ of over 0.96.

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