Session 2: Multiple Regression: Making Comparisons FAIRER

e.g. BREAST MILK AND SUBSEQUENT INTELLIGENCE QUOTIENT IN CHILDREN BORN PRETERM (Lucas et al Lancet 1992; 339: 261-64)

There is considerable controversy over whether nutrition in early life has a long-term influence on neurodevelopment. We have shown previously that, in preterm infants, mother's choice to breast milk was associated with higher developmental scores at 18 months. We now report data on intelligence quotient (IQ) in the same children seen at 7.5 - 8 years.

IQ was assessed in 300 children with an abbreviated version of the Weschler Intelligence Scale for Children (revised Anglicised). Children who had consumed mother's milk in early weeks of life had a significantly higher IQ at 7.5 - 8 years than did those who received no maternal milk. An 8.3 point advantage (over half a standard deviation) in IQ remained even after adjustment for differences between groups in mother's education and social class ($p < 0.0001$). This advantage was associated with being fed mother's milk by tube rather than with the process of breastfeeding. There was a dose- response relation between the proportion of mother's milk in the diet and subsequent IQ. Children whose mothers chose to provide milk but failed to do so had the same IQ as those whose mothers elected not to provide breast milk.

Although these results could be explained by differences between groups in parenting skills or genetic potential (even after adjustment for social and educational factors), our data point to a beneficial effect of human milk on neuro-development.

TABLE I - CHARACTERISTICS OF STUDY POPULATION

Characteristics	No mother's milk (group I) (n = 90)	Mother's milk (group II) (n = 210)
Mean (SEM) birthweight (g)	1420 (30)	1440 (20)
Mean (SEM) gestation (wk)	31.4 (0.3)	31.4 (0.2)
% males (no)	42 (38)	55 (116)*
Days in study: median (quartiles)	30 (22,45)	28 (20,40)
Days to full enteral feeds: "	8 (6,11)	7 (6,9)
% ventilated > 5 days (no)	12 (11)	12 (26)
% in social class I and II (no)	11 (10)	30 (63)+
% mothers higher educ. status (no)@	24 (22)	52 (109)+

*p < 0.05. +p < 0.001 @ GCE O levels or above (see text).

Table II - IQ AT 7.5 - 8 YEARS IN THE TWO GROUPS

Abbreviated WISC-R	Mean (SEM) scores Group I	Group II	Advantage for group II babies (95% CI)
Verbal scale	92.0(2.0)	102.1(1.3)	10.1 (4.7, 15.5)*
Performance scale	93.2(1.7)	103.3(1.2)	10.1 (6.0, 14.2)*
Overall IQ	92.8(1.6)	103.0(1.2)	10.2 (6.3, 14.1)*

*p < 0.001, group 1 vs group II CI = confidence interval

Table III - ADJUSTED ADVANTAGE IN WISC IQ SCORES FOR GROUP II BABIES

	Mean (SEM) scores Advantage	Advantage for group II 95% CI
Whole Group*		
Verbal scale	7.7	(3.3, 12.1)
Performance scale	7.9	(3.9, 11.9)
Overall IQ	7.6	(4.0, 11.2)
Successful**		
Verbal scale	7.7	(3.3, 12.1)
Performance scale	7.9	(3.9, 11.9)
Overall IQ	7.6	(4.0, 11.2)

* All 210 babies in Group II (compared with 90 in Group I)
** 193 babies from Group II who received breast milk (compared with infants from Group I plus those from Group II who received no breast milk: n=107)

p < 0.001, group 1 vs group II CI = confidence interval

Table IV- FACTORS RELATING TO IQ AT 7.5–8 YEARS

Factor	Increase in IQ	95% CI	p value
Received mother's milk	8.3	(4.9, 11.7)	<0.0001
Social Class	–3.5/class*	(–1.5,–5.5)	0.0004
Mother's education	2.0/group**	(0.5, 3.5)	0.01
Female sex	4.2	(1.0,7.4)	0.01
Days of ventilation	–2.6/wk	(–3.7,–1.5)	0.02

* Social class recorded as 4 categories: I/II, III non-manual, III manual, IV/V
** Mother's education coded on 5-point scale from 1 (no educational qualifications) to 5 (degree or other professional qualification)