

Issue 55 In a nutshell

Two new epidemiological studies show the importance of early childhood feeding on adult outcomes.

The first looked at childhood weight in relation to mortality, whilst the second studied IQ in relation to which infant formula had been fed.

Early diet and long term health

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NUTRITION RESEARCH REVIEW

Study 1: Childhood diet and adult mortality

Results of a 57 year long cohort study from Britain show that diet in childhood has a significant impact on mortality in later life. Energy intake, along with the related measure of body fatness, are crucial predictors of adult outcome.

The Boyd Orr Survey of Family Diet and Health began with an assessment of the health and diet of a large number of households in prewar Britain between 1937 and 1939. The English national health scheme allowed investigators to track these subjects into adult life.

In one part of the study, researchers examined the relation between childhood BMI and adult mortality. For this component, follow-up data was obtained on 2,399 men and women whose original age at the time of study had been between 2 and 15 years.

Higher childhood BMI was associated with greater all-cause and cardiovascular mortality in adult life (see Table 1).

The relationship was not entirely linear - the lowest mortality was seen in those adults who are children had been in the 25-49th centile of BMI distribution, rather than in those who had been below the 25th centile.

Ref: *Am J Clin Nutr* 1998;67:1111-8

A second part of this study tracked 3,834 children into adult life and compared their adult cancer mortality with their childhood energy intake. A significant association was found between childhood energy intake and adult mortality from those cancers which are not related to smoking.

Table 1: Adult mortality for children whose BMI was in 25-49th vs 75-100th centile

Mortality	Hazard ratio (95% CI)	
All-cause mortality	1.5	(1.1-2.2)
Ischaemic heart disease	2.0	(1.0-3.9)

The relative hazard per MJ increase in adult equivalent daily intake was 1.20 (95% confidence interval 1.07-1.34, p =0.001). This calculation took into account confounding effects of social variables and was found in men and women alike.

Ref: *BMJ*. 1998;316:499-504

Study 2: Infant feeding and IQ at 8 years

The nutrient richness of formula fed to pre-term infants can have significant long term effects on their IQ, according to another English study.

This study was a randomised, blinded nutritional intervention and follow-up trial over 8 years. 424 pre-term infants (<1850g at birth) were given either:

- (1) Standard infant formula;
 - (2) Nutrient-enriched pre-term formula as sole diet; or
 - (3) Nutrient-enriched pre-term formula as supplement to maternal milk;
- all for an average of 1 month.

At 7½ - 8 years of age, the 360 surviving children's IQ was tested using an abbreviated Weschler children's scale.

Significant outcomes were seen particularly in boys.

Boys fed standard term formula in infancy were found to have a 12.2 point verbal IQ disadvantage (95% CI: 3.7-20.6, $p < 0.01$), compared with those given pre-term formula.

When the standard formula fed children were compared with those given the highest doses of nutrient-enriched pre-term formula, the results were even more clear cut - see Table 2.

There was a higher incidence of cerebral palsy in those fed standard formula.

Ref: *BMJ* 1998;317:1481-1487

Table 2: IQ differences (standard vs highest dose nutrient enriched formula)

	IQ difference (95% CI)		Signif.
Overall IQ	9.5 points	(1.2-17.7)	$p < 0.05$
Verbal	14.4 points	(5.7-23.2)	$p < 0.01$

Comments

These are two impressive research projects with very different methodologies, both of which make us more aware of the importance of nutrition in our children.

Study 1 (the Boyd Orr study) is from the 'old school' of nutritional epidemiology, in that the measures of dietary intake are relatively insensitive, isolating one particular week's household intake, rather than that of customary or individual intake. Nevertheless, a great deal of useful information is now coming out from this long term project, and these two papers represent just some of that.

The cancer and energy intake results support a large body of evidence (much of it based on animal studies) that low energy intake (within reasonable limits) seems to be good for you. It is not surprising therefore that children with lower fatness also have lower mortality.

However, one thing that we do not yet know is: what are those reasonable limits? Particularly bearing in mind that the thinnest children had higher mortality than the medium low children. This is the famous

U-shaped BMI-mortality curve that so many other studies have demonstrated.

And we are far from understanding why this connection between energy intake and mortality exists. There are so many potential variables - confounding and otherwise - that might stand between the two that no one study can be expected to control for them.

The second trial offers the more powerful randomised blinded intervention design, and a more subtle outcome was investigated. The results are impressive. There is clearly an important long term cognitive effect of the nutrient richness of what we feed infants in their first month of life. This study is companion to those which have suggested, for example, effects of fatty acid composition on shorter term visual function, and on longer term CNS function.

Bear in mind that this study was only on premature infants. The implications of early feeding on normal term infants remains a fascinating topic under investigation.

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