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on nutrition and development

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A GROWING ISSUE UNDERSTANDING AND PROMOTING HEALTHY GROWTH AND DEVELOPMENT IN TODDLERS

A report from the Infant & Toddler Forum Study Days London 2007

Addressing Key Issues on the Nutritional Requirements
and Eating Behaviour of One to Three Year Olds

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INTRODUCTION

The Infant & Toddler Forum (ITF) recently held a series of regional study days to discuss the growth and development of young children.

This, of course, is a topic that is rarely out of the headlines. Only recently the Foresight report concluded that childhood obesity could cost the UK £45.5bn a year and could take 30 years to put right¹. This led the government to revise its target date for halting childhood obesity from 2010 to 2020.

But childhood obesity is just one of the challenges facing health and childcare professionals who are advising parents about healthy eating and living. Of equal importance is the need to identify and counter the early signs of poor nutrition and inadequate growth.

It was to discuss these important issues that the ITF study days brought together a multidisciplinary group of experts with first-hand experience in child nutrition, growth and development. The series aimed to offer practical guidance on how to measure and monitor children's growth and the appropriate actions to take when a toddler falls outside the normal developmental range.

In his introduction to the London study day, Lawrence Weaver, professor of child health at the University of Glasgow and chair of the ITF, stressed that the monitoring of childhood growth is not always easy. He pointed out that children grow at different rates at different times in early life, determined by both genetic and dietary factors and it could be difficult to determine who was simply an early or late developer and who was a genuine cause for concern.

"There is also ongoing debate about the benefits of monitoring, the ages when measurements should be made and the thresholds for action," said Professor Weaver.

It is therefore essential that health and childcare professionals are not only equipped with the necessary skills and knowledge to monitor children's growth but also to advise parents and carers on healthy eating habits, how to provide a nutritious diet and promote a healthy lifestyle and what to do if they are concerned about their child's development.

"Through resources such as the ITF factsheets and study days, we hope to bring you the best evidence-based information to take away and use in your day-to-day practice," Professor Weaver told the meeting.

Professor Lawrence Weaver



Chairman, Infant & Toddler Forum

STUDY DAY SPEAKERS ACROSS THE THREE EVENTS

Dr Robert Coombs, Consultant Neonatologist, Sheffield Teaching Hospitals.

Dr Gillian Harris, Senior Lecturer in Applied Developmental Psychology, University of Birmingham and Consultant Paediatric Clinical Psychologist, The Children's Hospital, Birmingham.

Judy More, Freelance Paediatric Dietitian, London.

Dr Robert Moy, Consultant Community Paediatrician, South Birmingham Primary Care Trust and Senior Lecturer in Community Child Health, University of Birmingham.

Dr John Puntis, Consultant Paediatric Gastroenterologist, Leeds General Infirmary.

Dr Atul Singhal, Honorary Consultant Paediatrician, Whittington Hospital and Great Ormond Street Hospital, Deputy Director, MRC Childhood Nutrition Research Centre and Reader in Paediatric Nutrition at the Institute of Child Health (ICH), London.

Tanya Urquhart, Macmillan late effects specialist nurse at Sheffield Children's NHS Foundation Trust Hospital.

Professor Lawrence Weaver, Samson Gemmell Professor of Child Health, University of Glasgow, Consultant Paediatrician.

WHAT THE DELEGATES SAID!

Midwife

'Eminent speakers, independent and research based information.'

Paediatric Dietitian

'Excellent day. I intend to share and improve weighing and measuring practices and also share the psychology of weaning.'

Student Health Visitor

'Fantastic, well organised and excellent range of topics... I will take into practice weighing and measuring accurately and when to act on problems.'

Children's Nurse

'Very useful and relevant to my practice. Excellent range of information.'

Health Visitor

'Thought provoking!'

Community Nursery Nurse

'A really interesting and informative day. I've learnt new info but had previous info re-iterated which has helped my confidence and learning'

PROMOTING HEALTHY GROWTH THROUGH NUTRITION

JUDY MORE

Offering practical advice to parents on how to feed their children a healthy diet can be a challenging task for any healthcare professional, paediatric dietitian Judy More acknowledged.

She pointed out that toddlers had high nutritional needs that were often difficult to meet because their stomachs were so small. Toddlers were also prone to faddy eating that, although a normal phase of development, could worry parents and interfere with the toddler's nutritional intake.

Ms More stressed that encouraging a balanced diet among toddlers would help reduce the risk of a number of common nutritional problems including:

- obesity
- iron deficiency anaemia
- dental caries
- constipation
- vitamin D deficiency and rickets

So, how do healthcare professionals advise parents on a "healthy diet"?

Clearly a balanced diet should contain the key nutrients: protein, carbohydrates, vitamins and minerals, said Ms More. However, many parents would be unsure about which foods would provide these nutrients in adequate amounts. It was therefore more useful to advise a diet made up of food from the five different food groups:

- bread, cereal and potatoes
- fruit and vegetables
- milk, cheese and yogurt
- meat, fish and vegetarian alternatives
- foods high in fat and sugar

"It's more important to talk to parents about the food groups than the nutrients," said Ms More.

She gave examples of foods from each category (see table1).

By making up meals and snacks with nutritious foods from the different food groups, the high nutrient needs of toddlers can easily be met. Ideally a toddler should have three balanced meals of toddler-sized portions, two to three nutritious snacks and six to eight drinks, per day. Two nutritious courses should be offered at the two main meals - a savoury course and a pudding -

as this gives two opportunities to offer foods with different nutrients thus offering a wider range of nutrients than would be given with just one course. Nutritious puddings will include combinations of ingredients such as fruit, flour, eggs, milk, yogurt, fromage frais and ground up nuts.

Table1

Bread, cereal and potatoes

Include in each meal and some snacks

- breakfast cereal
- white rice, pasta, couscous, plantain
- potatoes
- a mixture of white and wholemeal bread
- bread sticks, crackers, crisp bread
- flour-based foods eg pancakes, scones, buns, teabread

Fruit and vegetables

Include in each meal and some snacks

- cut up fruit is easier for toddlers to eat
- stir fry or bake or roast vegetables
- add to pizzas, sauces, soups

Milk, cheese and yogurt

Limit to 3 servings a day of which a serving is:

- 120mls milk in a cup or beaker
- pot yogurt/fromage frais or milk pudding
- cheese on pizza or in sandwiches
- milk or yogurt on breakfast cereal
- tofu

Meat, fish and vegetarian alternatives

2- 3 servings a day

- sausages, minced meat in burgers/meat loaf/sauces
- stews and casseroles
- chicken
- fish cakes and fish pies - mix oily fish and white fish
- Vegetarian alternatives including:
 - hummus /nut butters in sandwiches
 - dhal
 - beans or lentils in stews, curries and pasta sauce
 - nuts in puddings and cakes - but no whole nuts before five years
- oily fish, rapeseed oil and walnuts are good sources of omega 3 fats

Foods high in fat and sugar

In small amounts

- oil, butter and margarine
- cakes and biscuits with fruit sometimes
- ice-cream

Ms More emphasised that a toddler's intake can vary from day-to-day and as such parents should consider the intake of all the different foods eaten over a week, so that they do not become overly concerned with certain times when their toddlers may eat poorly. They can also assess if there is an excess of high fat/high sugar foods compared to the more nutritious foods.

THE DEVELOPMENTAL STAGES OF FEEDING

DR GILLIAN HARRIS

Children's taste patterns and appetites change remarkably as part of their normal growth and development, consultant clinical psychologist Dr Gillian Harris told the meeting.

Understanding these phases and milestones can help healthcare professionals advise parents who are concerned that their children's eating behaviour may be affecting their health.

Dr Harris, from the School of Psychology at Birmingham University, explained that infants were "programmed" from birth to prefer sweet tasting foods that would provide high energy nutrition and to avoid bitter tastes that might indicate something was unsafe to eat.

Indeed it was possible to influence children's taste even before they were born, said Dr Harris.

"Some flavours of food eaten by the mother are transmitted to amniotic fluid and swallowed by the foetus. Such flavours - such as garlic and aniseed - are recognised by the newborn infant who will turn towards the smell of aniseed if their mothers have eaten it during pregnancy²."

However, Dr Harris stressed that this effect did not necessarily mean that the child would go on to enjoy the taste they recognised.

"If the mother eats something while she's pregnant, the infant will develop a taste for it. But the effect is only weak and doesn't seem to affect intake later on."

The newborn child's early preferences and aversions would subsequently be modified by exposure to new tastes in milk and food, said Dr Harris. The eating behaviour of those around them would also affect their taste patterns.

"Infants are designed to learn to like foods that are eaten by those around them, foods which will therefore be safe and culturally appropriate," said Dr Harris.

During the weaning period there is a "window of opportunity" for introducing solids, said Dr Harris.

"It is easier to add new food during this period. It may be around this time that breast milk alone becomes insufficient and the infant will be indicating a need for more solids."

Dr Harris presented an analysis of data provided by the Avon Longitudinal Study of Parents and Children (ALSPAC) in which it was found that early fruit and vegetable consumption predicted fruit and vegetable consumption at seven years³.

Experience of eating lumpy foods at six months of age also seemed to have a beneficial effect, said Dr Harris. One study has shown that the late introduction of lumpy solid foods can lead to reports of feeding difficulties in toddlers at fifteen months⁴.

"We have looked to see whether this effect is still present in children of seven years of age," said Dr Harris.

This analysis showed that children introduced to lumpy solids after the age of nine months were reported as having more feeding problems at seven years (food refusal and food 'fussiness')⁵.

"But perhaps more interestingly we also discovered a difference in the foods accepted by these children. Children who were introduced to lumpy solids after nine months of age ate fewer of all 10 categories of fruit and vegetables tested than did children introduced to lumpy solids before this age."

Dr Harris said that by 18 months most children would develop a "neophobic response" that would inhibit their easy acceptance of new foods. This heralds the faddy eating phase common to most toddlers. The key to getting through this period is to keep exposing the child to new foods, even though these may be rejected at first.

"The neophobic response decreases as the child matures, and is exposed to other foods and other social groups," said Dr Harris. *"The more foods that they see being eaten by others around them the more things the infant will try. The key thing is exposure, exposure, exposure."*

HOW DO YOU MEASURE GROWTH?

TANYA URQUHART

Health and childcare professionals should always take parents' concerns seriously if they are worried about their child's growth. Tanya Urquhart, a Macmillan late effects specialist nurse at Sheffield Children's NHS Foundation Trust Hospital, acknowledged that in many cases the concern would be unfounded and the parents would simply require reassurance. Nevertheless, it was always worth measuring the child to make sure.

"It is never okay to just say that a child is not growing. A parent's worry is correct until you prove otherwise," said Miss Urquhart.

When measuring a child, Miss Urquhart stressed that a single measurement was never enough. Sequential measurements, ideally three, should always be taken. These could then be plotted on a centile chart to check whether the child was veering away from their centile line. Parental height should also be taken into account when deciding whether a child was growing normally.

Miss Urquhart listed a variety of equipment that could be used for measuring height (see table 2).

Table 2

Equipment for measuring height

- The Leicester Height Measure - easy to use and there is no need for calibration. It has the advantage that no metre stick is necessary to check its accuracy.
- The Harpenden Stadiometer - gives an accurate and direct reading but is expensive and requires daily calibration with a metre stick.
- The Measure Mat - lightweight, portable, non-stretch, non-shrink plastic roll-up mat. Designed for measuring length of a first year infant in a clinic or at home visit.
- The Rollameter 100 - lightweight, portable, non-stretch, non-shrink, hygienic roll-up mattress of closed cell plastic foam. Accurate to 1mm. Designed for measuring a first year infant.

Other useful equipment included the Lasso-o™ Child Growth Foundation tape for measuring occipitofrontal circumference (OFC) and EU-approved scales for measuring weight.

On the controversial subject of when to measure a child, Miss Urquhart advised healthcare professionals to be guided by official advice (see table 3) but ultimately to rely on their own clinical judgement.

"There are a lot of tables advising on when to measure. But at the end of the day we are all health professionals and it comes down to clinical judgement. If the mother is worried then it is always better to measure than not to."

Health For All Children, edition four, also suggests opportunistic measurements each time a child requires a visit to a medical setting, i.e. GP, hospital or out-patient clinic.

Table 3 When to measure^{6,7}

Age	Weight	Occipitofrontal Circumference	Length
Birth	X	X	Measure When Health Concerns or Parents Request Reassurance
5 days	X		
10 days	X		
6-8 weeks	X	X	
12 weeks	X		
16 weeks	X		
32 weeks	X		
13 months	X		

Miss Urquhart stressed that good technique was important when measuring a child's height or length.

“Children up to the age of two should be measured supinely recording crown to heel length using a Rollameter measurer or measure mat. After the age of two they should be measured standing unless, of course, they have a disability that does not allow them to do this. Make sure they stand with their legs straight and bottom and shoulder blades against the vertical and arms down by sides. Also make sure the measure makes a good firm contact with the skull.”

“We always have respect for religions - turbans for instance - and measure with any religious clothing in place as normal, documenting that fact. But for all other populations, we remove hair grips, bobbles and flatten gelled hair.”

Miss Urquhart stressed that accurate plotting of a child's height could offer vitally important information about their health and development. But it was also important to take both of the child's biological parents' height into account.

“The mid-parental height (MPH) can then be drawn and this can tell you the expected genetic potential of the subject. It may just be that the child has short parents, and that they are following their target centile range.”

Miss Urquhart concluded by considering those cases in which the measurements revealed a potential problem with the child's growth. In these cases it was often necessary to refer the child to a specialist, she said. Any child who was growing at an inappropriate rate or who was inappropriately short or tall for their parents' heights i.e outside their genetic / target centile range, should be referred.

Finally, Miss Urquhart stressed that it was particularly important to refer girls who appeared short for their age and who fell out of their target centile range.

“These girls should be screened for Turners syndrome regardless of whether they appear phenotypically normal,” she said.

REMOVING THE FAILURE FROM FAILURE TO THRIVE

DR ROBERT MOY

The term “failure to thrive” can stigmatise parents and lead to an over-medicalised management of the child, Dr Robert Moy, senior lecturer in child health at the University of Birmingham, told the meeting.

As a consequence, children who were considered not to be developing normally could be subjected to inappropriate force feeding and meal time battles, hospitalised and forced to undergo endless (often negative) tests while their parents were either blamed for their child's “failure,” given conflicting advice or simply told nothing was wrong. In the worst case scenario the child might even be taken into care.

“The phrase failure to thrive will bear heavily on parents,” said Dr Moy. *“It's a highly emotive issue leading to anxiety and guilt. But this can occur in all homes, not just in deprived homes.”* As a result of this Dr Moy explained that the preferred term was now either weight faltering or growth faltering.

Furthermore, Dr Moy pointed out that there was little consensus on what weight faltering actually meant.

To highlight this, he presented numerous different criteria used to define weight faltering. These included:

- less than 75 per cent of expected weight for age
- weight < 5th centile (or 3rd, 2nd or 0.4th)
- weight < 80 per cent of median weight for height
- BMI < 5th centile
- weight discrepant with length and head circumference

- weight deceleration crossing two or more centiles
- low conditional weight gain (thrive index)⁸

However, no single measurement on its own was able to identify nutritional growth delay.

“And only 5 per cent of these children were found to be at risk of abuse, so maybe the role of poor parenting has been overstated by social services in the past,” said Dr Moy.

Dr Moy stressed that weight faltering was common in early childhood.

“Weight faltering was found in one in 20 infants in a Newcastle community survey and 8.6 per cent of 11,900 ALSPAC infants in their first nine months.”⁹

However, the estimated prevalence depended on the definition and cut off criteria used.¹⁰ For instance, the prevalence of poor weight gain in the ALSPAC Child in Focus sub-sample was estimated at 7.1 per cent using UK 1990 criteria but only 1.7 per cent according to the WHO 2006 Growth Standard.

“So are we unnecessarily worrying many mothers by weighing babies?” asked Dr Moy.

Dr Moy outlined how weight faltering should be assessed and managed in primary care. This should include:

- a dietary history and food diary
- details of mealtime routines
- social history
- consideration of family anxieties, (for instance post-natal depression)
- meal time observations

The first step was to exclude any organic cause of the problem, said Dr Moy (see table 4).

Table 4

Organic causes of weight faltering	
Pregnancy, birth:	intra-uterine growth retardation
Persistent vomiting:	gastro-oesophageal reflux
Diarrhoea, muscle wasting, distended abdomen:	coeliac disease
Lethargy:	anaemia
Recurrent infections:	immunodeficiency
Chronic cough, wheeze:	cystic fibrosis
Breathlessness:	congenital heart disease
Delayed development:	cerebral palsy, muscle disease
Urinary symptoms:	renal disease
Dysmorphic features:	syndromes, cleft palate

He explained that children with an organic cause would usually have significant symptoms and physical signs of disease. Their poor weight gain would tend to be of early onset and they were more likely to be in the 0.4th centile or below.

“Organic cases should be easily picked up,” said Dr Moy. “But these are less than 5 per cent of the total of children with weight faltering.”

The remaining 95 per cent of children, whose weight faltering was not due to an organic cause, should be managed using a combination of dietary and behavioural advice, said Dr Moy (see table 5).

Table 5

Management of weight faltering
<p><i>Dietary advice</i></p> <ul style="list-style-type: none"> - three meals and two to three snacks a day - increase energy and protein density (cheese, margarine, cream) - decrease fluid intake (squash, milk) - treat iron deficiency - vitamin drops
<p><i>Behavioural management</i></p> <ul style="list-style-type: none"> - regular family meals - encouragement and praise - small attractive meals - allow mess - set time limits to meals - no force feeding

Dr Moy concluded that while weight faltering was common among young children and often of no lasting medical concern, healthcare professionals should never dismiss a parent's concern over their child's growth and development.

“Weight faltering is a common problem but it has also been over-diagnosed in the past and there are no real serious long-term effects. But clearly it's of great concern to parents and we must take it seriously.”

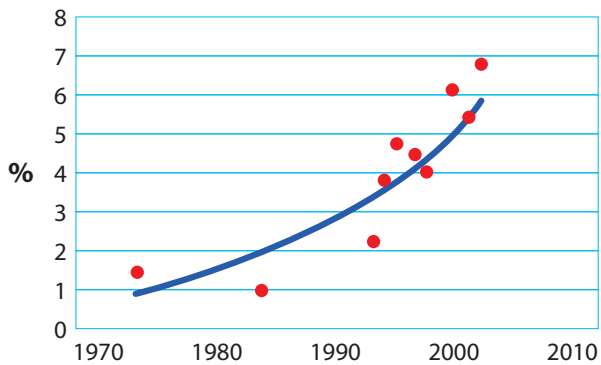
CHILDHOOD OBESITY - WHEN TO BE CONCERNED

DR ATUL SINGHAL

Dr Atul Singhal, reader in childhood nutrition at the Institute of Child Health, London, presented evidence that obesity was on the increase in children as young as two years old (see fig 1). *“Unless the rise of overweight and obesity in very young children can be quickly addressed, there will be an epidemic of heart disease, diabetes and other weight-related conditions when these children reach adulthood and middle age,”* Dr Singhal told the meeting.

Fig 1

Obesity in Children 2-15 in England¹¹



“In the Millennium cohort¹², 23 per cent of three-year-olds are overweight; 11 per cent are obese and 33 per cent of black children are overweight at the age of three. So, we are seeing more and more cases of extreme obesity in children and this should be of concern to us because we know that what happens in toddlers affects what happens in adulthood.”

Unfortunately, many of these obese toddlers would go on to become obese adults, said Dr Singhal.

“One in three obese three to five-year-olds will become obese adults. And we know that childhood obesity doubles the risk of later cardiovascular disease and raises the risk of the metabolic syndrome by three times¹³.”

Unfortunately, diagnosing overweight in children was not straightforward, said Dr Singhal. Whereas adults could be diagnosed according to body mass index (BMI) cut-off points, children should be diagnosed according to where their BMI fell on an appropriate centile chart (see table 6).

“The younger the child the more difficult it is to estimate obesity. The toddler age group is particularly important,” said Dr Singhal.

Table 6

Overweight and obesity in adults

Body Mass Index	
25-30	Overweight
30-35	Obese
35-40	Severely obese
>40	Morbidly obese

Overweight and obesity in children

BMI centile	
>91st	Overweight
>98th	Obese

Children who should have their BMI assessed included those whose:

- weight is two centiles above their centile for height
- weight is above the 98th centile
- weight crosses a centile line upwards
- parents are concerned about their weight

Dr Singhal said the causes of toddler obesity, like adult obesity, came down to diet and exercise.

Risk factors included:

- more than eight hours of TV per week
- parental obesity
- rapid weight gain in first year
- less than 10 hours sleep in each 24 hours at three years

“If you look at today's toddler's diet compared to what it was in the 1950s then you find that less energy comes from bread and potatoes whereas substantially more energy comes from sweets, soft drinks and juices. So today's toddlers are filling up on fats and sugars rather than complex carbohydrates,” said Dr Singhal.

Meanwhile the trends for physical activity were going in the opposite direction.¹⁴

The American Academy of Paediatrics recommends that children from nought to two-years-old should not watch any television but 68 per cent exceed this recommendation. Three to four-year-olds should watch no more than two hours, said Dr Singhal.¹⁵

Once a child had been diagnosed as overweight or obese the management strategy was one of dietary and lifestyle advice. This should include recommendations of regular family meals, healthy dietary advice as outlined earlier by Judy More, strict limits on TV watching and encouraging active play, family activities and sport.

KEY LEARNING POINTS

- A balanced diet for toddlers will help to reduce the risk of common nutritional problems including obesity, iron deficiency anaemia, dental caries, constipation, vitamin D deficiency and rickets
- Because parents may be unsure about which foods provide which nutrients, a diet made up of food from the five different food groups is recommended
- Ideally a toddler should have three balanced meals of toddler-sized portions, two to three nutritious snacks and six to eight drinks, per day
- The weaning period is the ‘window of opportunity’ for introducing solids
- The ‘neophobic’ stage is a normal phase in toddler development, when it is important to keep exposing the child to new foods, even if he or she rejects them at first
- When measuring the height or length of a child, three sequential measurements should be taken
- Healthcare professionals should be guided by official advice on when to measure, but also use their own clinical judgement
- Children up to two years should be measured lying supinely recording crown to heel length
- Children over two years should be measured standing, unless they have a disability that prevents this
- Less than 5 per cent of children with growth faltering have organic causes and this group will usually have significant symptoms and physical signs of disease
- The 95 per cent with no organic cause for growth faltering should be managed using a combination of dietary and behavioural advice
- There are usually no serious long-term effects of transient growth faltering, but it can cause concern to parents and should be taken seriously
- One in three obese three to five-year-olds will become an obese adult
- Childhood obesity doubles the risk of later cardiovascular disease and raises the risk of metabolic syndrome by three times that of the non-obese child
- The diagnosis of childhood overweight or obesity is defined by BMI on an appropriate centile chart
- The management of toddler obesity requires attention to diet and exercise
- Healthcare professionals should develop and update their skills and knowledge on child growth assessment as part of their continuing professional development

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Factsheets:

Download / order Factsheets that cover topics discussed here in more detail

Study Days:

Register for the 2008 Study Days

Open Book On Growth:

Register for 'Open Book On Growth', our new online educational resource designed to help healthcare professionals develop and update their skills and knowledge on child growth assessment as part of their continuing professional development

General Information

- The Infant & Toddler Forum brings together representatives from paediatrics, neonatology, health visiting, dietetics and child psychology who share a common professional interest in infant and child health and nutrition
- A goal of the Forum is to improve the access of healthcare professionals to reliable, evidence-based nutritional information relevant to their practice, which will equip them to advise and support the parents of infants and young children
- The Forum is supported by an educational grant from Danone UK.

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