Southampton School of Psychology Nutrition and the mental health of children.

Jim Stevenson 24/25 April 2015

Pinkie Resilience Project Seminar, Musselburgh



Outline of talk: 1

- What do we mean by mental health in young children?
- What are the costs of poor child mental health?
- How important are broad social factors?
- How important is nutrition to mental health?
- What is ADHD?



Outline of talk: 2

- Which aspects of diet might influence hyperactivity?
 - Sugar
 - Junk food
 - Fatty acids
 - Food intolerance
 - Food colours/additives
- How important are these dietary factors for hyperactivity?



What do we mean by mental health in young children (0-5)?

Behavioural Development: A Series of Monographs PRE-SCHOOLTO SCHOOL A Behavioural Study



O J.STEVENSON P.J.GRAHAM First epidemiological and longitudinal study of the mental health of preschoolers, published in 1982



What do we mean by mental health in young children (0-5)?

- Disruptive behaviour
 - ADHD (e.g. inattention, impulsivity)
 - Oppositional problems (e.g. angry, non-compliant)
- Emotional problems
 - Anxiety
 - Depression
 - Post-traumatic stress



What do we mean by mental health in young children (0-5)?

- Eating and feeding problems
 - Infant colic
 - Failure to thrive
 - Food refusal
- Plus other less common early onset problems e.g. autism



What are the costs of poor child mental health?

Additional health, social care and education costs associated with child psychiatric disorders totaled £1.47bn in 2008. The lion's share of the costs falls to frontline education and special education services. There are huge costs to the public sector associated with child psychiatric disorder, particularly the education system.

What are the costs of poor child mental health?



Population aged 5–15 with disorder	Service type/setting	National cost estimate (£ million)
813,000	Primary care	15.8
	Paediatric/children's health services	26.2
	Mental health services	64.2
	Frontline education	799.2
	Special education	503.8
	Social care	56.6
	Total cost	1,465.8

Snell et al. (2013) JCPP, 54, 977-985

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How important are broad social factors? -mental health and social capital

Association	Family structure	Parent- child relations	Adult interest	Parental monitoring	Extended family support	Composite/ Other family social capital	Social support networks	Civic engagement	Trust & safety	Religiosity	Quality of school	Quality of neighbourhood	Composite/Other community social capital	Total
Number of investigated associations	10	25	3	9	6	10	33	9	5	9	13	28	12	172
Positive	3	16	2	3	2	9	17	2	2	4	6	13	5	84
Negative	1			4			1					1		6
None	5	2	1	2	3	1	7	7	2	2	3	10	6	51
Sub-group differences		4			1		4			3	4	3		19
Inconclusive results	1	3					4		1			1	1	11

Table 1 Evidence table showing pattern of investigated associations between social capital and mental health/behavioural problems

McPherson et al. (2014) BMC Psychology,2,7

How important is nutrition to Southampto School of Psychology

Malnutrition - leads to growth stunting

"Nutritional interventions in early childhood have had mixed results.

Prevention of iron-deficiency anaemia in Chilean infants improved behaviour and temperament at 12 months.

However, no benefits were reported for iron supplementation, zinc supplementation, or both, for the behaviour of 6–7-year-old Mexican children, and

nutritional supplementation of stunted Jamaican children in early childhood did not improve their behaviour at age 11–12 years or their mental health at age 17–18 years."

so impact of malnutrition on mental health uncertain

How important is nutrition to child mental health?



Malnutrition and cognitive development

- Stunting in early life has lasting effects until at least age 8 or 9 and up to 15 years on IQ scores, school performance, and tests of conservation
- A major limitation to forming conclusions from cross-sectional and longitudinal studies is that one cannot be confident that the relationship between undernutrition and cognitive performance is an independent factor and not due to other confounding factors.
- Research to date on the effects of undernutrition on cognitive development raises the question of whether protein-energy malnutrition alone, or a deficit in the accompanying micronutrients, is responsible for cognitive deficit.

Bryan et al. (2004). Nutrition Research Reviews, 62, 295-306

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Types of diet

What about adults?

High intakes of fruit, vegetables, fish, and whole grains may be associated with a reduced depression risk Lai et al. (2014)

Lai et al (2014). American Journal fo Clinical Nutrition, 99, 181-197

How important is nutrition to Southampton child mental health?

Types of diet

What about children?

Relationship Between Diet and Mental Health in Children and Adolescents: A Systematic Review

Adrienne O'Neil, BA(Psych/Soc)(Hons), PhD, Shae E. Quirk, BAppSci(Psych), GradDipPsych, Siobhan Housden, MA (Hons), Sharon L. Brennan, BA(Hons), PhD, GCALL, Lana J. Williams, BPsych, GradDipAppPsych, PhD, Assoc MAPS, Julie A. Pasco, BSc(Hons), Dip Ed, PhD, MEpi, Michael Berk, MBBCh, PhD, and Felice N. Jacka, PgDipSci, PhD

October 2014, Vol 104, No. 10 | American Journal of Public Health

How important is nutrition to Southampton child mental health? Types of diet

What about children?

A review of 12 epidemiological studies .

Found evidence of a significant, cross-sectional relationship between unhealthy dietary patterns and poorer mental health in children and adolescents

BUT DOES THIS MEAN THAT POOR DIET CAUSUES POOR MENTAL HEALTH?

How important is nutrition to Southamptor child mental health? Types of diet

What about children?

These cross-sectional studies have shown an association



Does this mean that diet causes depression?

Or does your mental state influence food selection?



How important is nutrition to Southampton child mental health? Types of diet

What about children?

Or could some shared common influence produce the association



How important is nutrition to Southampton child mental health?

Types of diet

What about children?

BUT DOES THIS MEAN THAT POOR DIET CAUSUES POOR MENTAL HEALTH?

We cannot say unless we have longitudinal data

Or, even better

Experimental studies e.g. randomized controlled trials

How important is nutrition to mental health?

Eating habits e.g. missing preakfast

2001)

Ideally students should eat breakfast, but if this is omitted, then a glucose snack or drink before the first class may reverse any adverse effects. Morris & Sarll



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Pharmacological effect One aspect of child mental health particularly influenced by nutrition is ADHD



What is ADHD?

Hyperactivity is a pattern of behaviour showing marked individual differences in the general population and comprises overactive, impulsive and inattentive behaviour.

- Children with an extreme degree of hyperactivity may be diagnosed with Attention-Deficit Hyperactivity Disorder (ADHD).
- Increased hyperactivity is associated with later educational difficulties and antisocial behaviour



What is ADHD?





What causes ADHD?



• Genetic differences between children

- Uncommon experiential risks
 - Heavy prenatal alcohol exposure
 - Prenatal nocitine exposure
 - Low birth weight
 - High-level lead exposure
- Common experiential risks
 - Electronic media
 - aggression, yes
 - inattention, maybe
 - Diet



Which aspects of diet might influence hyperactivity? - Sugar

"Parents of children with ADHD frequently report a worsening of hyperactivity after an excessive ingestion of candy or diet soda. Isolated reports support the parents' observations, but the majority of controlled studies fail to demonstrate a significant adverse effect of sucrose or aspartame."

Millichap & Yee (2012) Pediatrics, 129, 330-9 22

Which aspects of diet might influence hyperactivity? - Junk food

"ADHD-associated"	"Healthy" Foods:
Foods to Avoid	Preferred
Takeaway fast foods	Fish, steamed, grilled or canned
Red meat	Vegetables
Processed meats	Tomato
Crisps, potato chips	Fresh fruit
High-fat dairy products	Whole grains
Soft drinks	Low-fat dairy products



A higher score for the Western dietary pattern was associated with ADHD diagnosis (odds ratio = 2.21) after adjusting for known confounding factors from pregnancy to 14 years.

Howard et al. (2011) Journal of Attention Disorders, 15, 403-411

Which aspects of diet might influence hyperactivity? - Fatty acids

c. Supplementation with Free Fatty Acids



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Treatment studies

Sonuga-Barke et al. (2013) Am. J. Psychiat., 170, 275-289 24

Which aspects of diet might influence hyperactivity?Food intolerance



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Treatment studies

Sonuga-Barke et al. (2013) Am. J. Psychiat., 170, 275-289 25

Which aspects of diet might influence hyperactivity?- Food colours/additives



b. Artificial Food Colour Exclusions



These are treatment studies on children with ADHD.

We have carried out studies on colours/additives children from the general population.

Sonuga-Barke et al. (2013) Am. J. Psychiat., 170, 275-289 ₂₆ Which aspects of diet might influence hyperactivity?Food colours/additives



Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: a randomised, double-blinded, placebo-controlled trial

Donna McCann, Angelina Barrett, Alison Cooper, Debbie Crumpler, Lindy Dalen, Kate Grimshaw, Elizabeth Kitchin, Kris Lok, Lucy Porteous, Emily Prince, Edmund Sonuga-Barke, John O Warner, Jim Stevenson

Lancet 2007; 370: 1560-67

Which aspects of diet might influence hyperactivity?Food colours/additives



Mixtures of certain artificial colours together with a sodium benzoate preservative in the diet increased hyperactivity in 3 and 8/9 year old children in the general population.

Although the results of the study suggest that some mixtures of certain artificial food colours and benzoate preservative may affect the level of hyperactive behaviour in children, removal of these additives from the diet would not be a panacea for ADHD.



Food Standards Agency

Update on food colours Thursday 13 November 2008



The Food Standards Agency Chief Executive, Tim Smith, has written to stakeholders giving an update on the UK position on six artificial food colours and their effect on children's behaviour. Government Ministers have now agreed with the Agency proposal for a voluntary ban on these colours.

The Agency recommendation followed the Southampton study which looked into the effects of these colours, and proposed voluntary action by UK manufacturers to remove these artificial colours by the end of 2009.

European Union response

Press release

EUROPEAN PARLIAMENT

Modernising the rules on food additives and labelling of azo dyes Food safety - 08-07-2008 - 12:30

Food additives must be safe and bring benefits to consumers

Food additives will be completely banned in unprocessed food, as will sweeteners and colourings in food for babies and small children, except when specifically included in the Community list. Member States may continue to prohibit the use of certain categories of food additives in traditional foods produced on their territory.

Better labelling of additives containing azo-dyes

As new scientific data on health risks for children exposed to azo-dyes had emerged since Parliament's first reading, MEPs managed to include in the compromise a new provision that foods containing some of those food colours (colourings E 110, E 104, E 122, E 129, E 102 and E 124) must be labelled not only with the relevant E number but also with the words

"may have an adverse effect on activity and attention in children".



Response from manufacturers Southampton School of Psychology



Nestlé removes all artificial additives from confectionery in the UK and Ireland

March 2012



Confectionery company Nestlé has announced it is removing artificial colours and flavouring from its US chocolate and sweets

February 2015

31



How important are these dietary factors for hyperactivity?

Diet can act along with other environmental and genetic factors to influence a child's position on this continuum.

Environmental influences can be mediated either socially (e.g. parenting) or biologically (e.g. lead exposure).

Diet is a potentially important biologically mediated environmental influence on ADHD behaviours.

A final word on diet and behaviour School of Psychology

[™]JOURNAL GCHILD PSYCHOLOGYAND PSYCHIATRY

Journal of Child Psychology and Psychiatry 56:5 (2015), pp 497-499



doi:10.1111/jcpp.12418

Editorial: Diet and children's behaviour problems – disentangling urban myth from clinical reality

Studies suggest a statistically significant but clinically limited role for dietary treatments (both supplements and exclusions)-farless than envisaged by some of the promoters of the diet-behaviour narrative but greater than expected by their sceptics.

> Edmund J. S. Sonuga-Barke Editor-in-Chief



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