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POLYUNSATURATED FATTY ACIDS (PUFAS) FOR CHILDREN WITH SPECIFIC LEARNING DISORDERS: A COCHRANE REVIEW

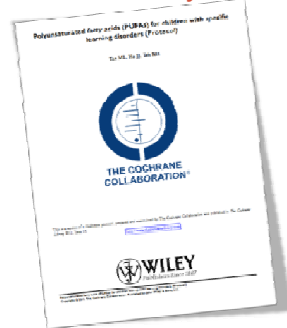
Tan ML¹, Ho JJ¹, Teh KH²

¹Department of Paediatrics, Penang Medical College, Penang, Malaysia
²Department of Pediatrics, Hospital Sutanah Bahiyah, Alor Setar, Malaysia



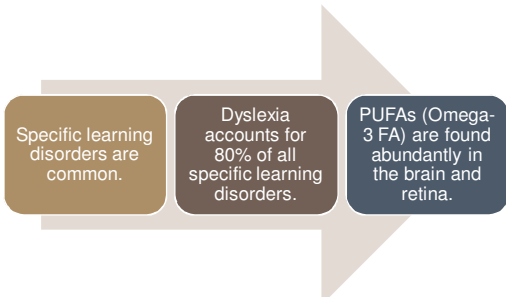

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The Cochrane Library, Issue 10, 2011



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Background



- Specific learning disorders are common.
- Dyslexia accounts for 80% of all specific learning disorders.
- PUFAs (Omega-3 FA) are found abundantly in the brain and retina.

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But is it “brain food”?



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PUFAs and learning



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How PUFAs can help in learning disorders?

- Magnocellular pathway
- Working Memory
- Dark adaptation

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Are children with SLD deficient in PUFAs?

- Case report in 1985 (Baker, 1985)
 - A sixth grader "Michael" with reading disorder
 - "...had very dry, patchy dull skin.....his finger nails were soft and frayed at the end.....he had dandruff.."
- Stevens, 1996 and Richardson, 2000 demonstrated that children with dyslexia have FADS
 - excessive thirst
 - frequent urination
 - dry skin
 - dry hair
 - brittle nails
 - dandruff and follicular keratosis

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Why is this review important?



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Methods

OBJECTIVES:

- To assess the effect of PUFAs supplementation in children with specific learning disorders on learning outcomes.
- To determine if there are any adverse effects of PUFAs supplementation in these children.

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Methods

INCLUSION CRITERIA:

- Randomised or quasi-randomised controlled trials.

PARTICIPANTS

- Children under the age of 18 years with
 - Reading disorder (developmental dyslexia).
 - Mathematics disorder (developmental dyscalculia).
 - Spelling disorder.
 - Writing disorder.
- May occur with other neurodevelopmental disorders such as ADHD and autism spectrum disorders.

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Methods

Intervention:

- PUFA vs control (placebo or standard treatment)

Outcome measures:

- Primary
 - Standardised test of reading, writing, spelling or mathematics
- Adverse effects
- Secondary outcomes:
 - Self-reported, parent or teacher reported outcomes

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Methods

Database search

- Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, PsycINFO, ERIC
- Conference proceeding
- Clinical trials register (clinicaltrials.gov)
- Standard Search Strategy
- No language limitation

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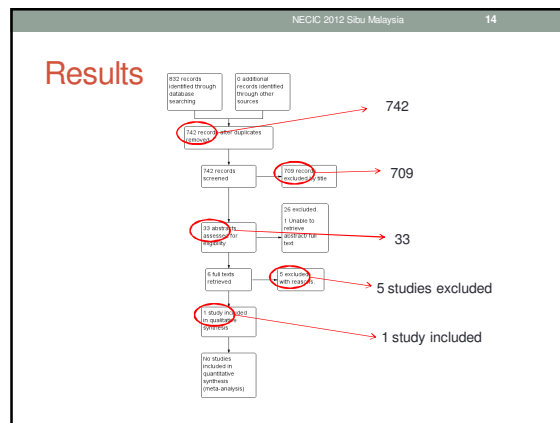
Methods

Selection of studies

- Two authors independently screened and selected the studies.

Assessment of risk of bias:

- Cochrane Collaboration tool
- Sequence generation
- Allocation concealment
- Blinding
- Incomplete outcome data
- Selective outcome reporting



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Results

- Six full-text were retrieved and five, were excluded.
- 2 studies had participants with reading disorder but one (*Lindmark 2007*) was an open labeled study and the other (*Richardson 2002*) did not measure any learning outcomes.
- 2 studies measured reading outcomes but 1 had participants with developmental coordination disorder (*Richardson 2005*) and the other with ADHD (*Johnson 2009*).
- 1 was a review of Richardson 2005.

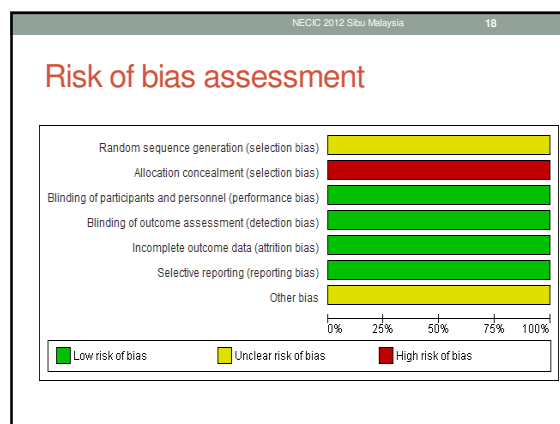
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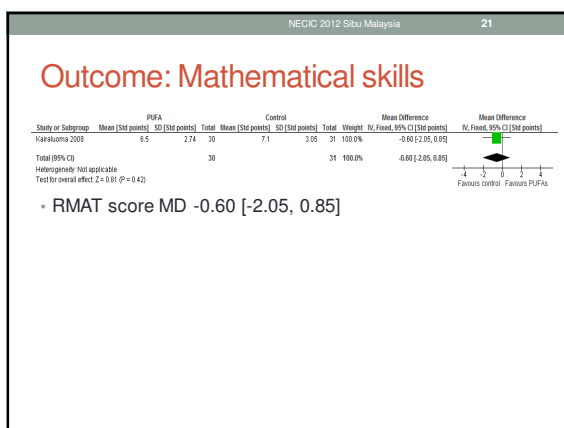
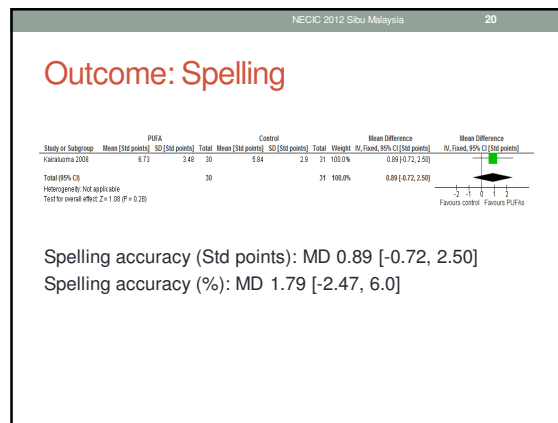
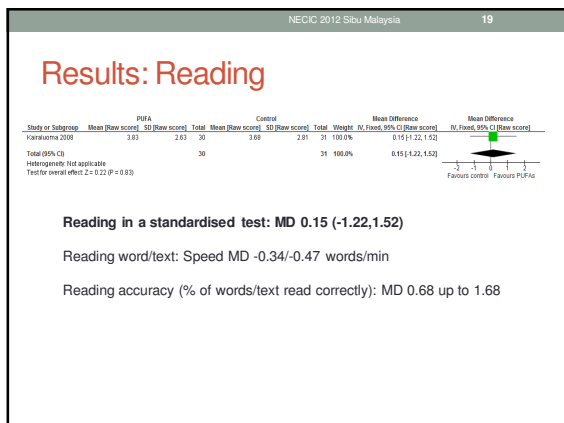
STUDY ID	REASON FOR EXCLUSION
Johnson 2009	Excluded because population studied were children with ADHD. Though reading and writing difficulties were assessed they were not stratified into separate groups before randomisation.
Lindmark 2007	Excluded because it is not a randomised controlled trial. There was no comparison group.
Portwood 2006	Excluded because it is a review of the results of <i>Richardson 2005</i> . It had reported results of 2 other unpublished non randomised controlled studies, out of which one study population did not have learning difficulties.
Richardson 2002	Even though the study population is children with specific learning disabilities (dyslexia), no learning outcomes were measured. The only outcome measured was ADHD symptoms using the Conner's Parent Rating Scale. Note: <i>Richardson 2000</i> is probably a duplicate of this but we were unable to retrieve the full text even after contacting the author.
Richardson 2005	This study only included children with developmental coordination disorder. No attempt was made to separate out a subgroup who had specific learning disabilities. Though reading and writing difficulties were assessed as an outcome, the results cannot be applied for children with specific learning disabilities.

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Results: Only one study is included.

- Kailarouma 2008**
 - Setting: Finland
 - 61 children (aged 9-12 years) with dyslexia
 - 500mg ethyl-EPA vs placebo for 90 days
 - Blinded study but allocation concealment could result in exposing the allocation of intervention to the whole group.





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Discussion

- No difference in the reading, spelling and mathematical skills.
- Quality of evidence:
 - **Low quality**
 - Limitation of Study design: Lack of allocation concealment
 - Imprecision: Small sample size
- Limitations:
 - Discrepancy of basic science vs clinical trials
 - Not enough evidence to recommend age of supplementation or dose.

GRADE

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Conclusion and Recommendations

- Implication for practice:
 - Not enough evidence to support or refute the use of PUFAs in children with specific learning disorders
 - In view of safety concerns, each needs to weigh the benefits (presumed) vs. harm.
- Implication for research:
 - Larger, well designed studies are needed.
 - Studies need to include measurement of learning outcomes and adverse effects.

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