

**1. Inadequate amounts of omega 3 can be a reason to children brain disability such as attention deficit disorder.**

Attention deficit hypersensitivity disorder (ACDH) is most common disorder in school age children. ACDH is a developmental disorder which is characterised by inappropriate development, inadequate attention, impulsivity and hyperactivity in children. Omega -3 fatty acid is an alternative medication for ACDH. Both omega-3 & 6 are essential for human and cannot be synthesized in the body, so they are provided by the diet. The longer chain, highly unsaturated fatty acid (HUFA), of each series, omega-6 (alpha- arachidonic acid) and omega-3 that is eicosapentaenoic acid (EFA) and docosahexaenoic acid (DHA) are important for development of brain.

Studies were carried out to determine the efficacy of omega-3 or n-3 HUFA in ADHD symptoms. For this, SWAN and conner's questionnaires were used to access change in ADHD symptoms. 26 children were divided into two groups and participated in 16 weeks study. In first phase, group A administered with n-3 HUFA and group B received n-6 HUFA as placebo. In second phase group B received n-3 HUFA and group A received same n-3 HUFA. Analysis of the teacher completed SWAN questionnaire revealed, no significant difference in ADHD symptoms whereas parent version based on conner's questionnaire showed significant improvement in ADHD symptoms like impulsivity and inattention during first phase. In phase2, group B showed more improvement as compared to group A. In fat analysis, n-3 HUFA family (EFA and DHA ratio) levels increased and ALA to EFA ratio declined in first phase (table no. 1). In second phase, no significant change occur in levels of EFA and DHA, whereas increase in level of ALA to EFA ratio (table no.2).

Table no. 1

www.ncbi.nlm.nih.gov/pmc/articles/PMC2661312/table/01.pdf#110897

FA	Group A	Group B
Total n-3	7.44±0.56 <sup>***</sup>	3.49±0.15
Total n-6	36.79±0.76 <sup>***</sup>	48.49±0.91
Total n-7	1.33±0.07	2.67±0.19
Total n-9	15.84±0.10	14.76±0.15
Total monoterpenes	0.01±0.01	0.53±0.01
Total sesquiterpenes	0.10±0.16	0.33±0.11
Total monoterpenoids	21.61±0.73	21.39±0.13
Total PUFAs	47.91±1.60	47.07±0.81
Total trans	0.42±0.04	0.40±0.05
18:1 (n-7)/18:2 (n-6)	0.01±0.00	0.01±0.01
18:2 (n-5)/18:4 (n-6)	4.11±0.11	4.74±0.11
20:1 (n-3)/20:4 (n-6)	0.01±0.00	0.02±0.00
24:0/20:0	0.61±0.07	0.71±0.05
24:0/20:0	2.03±0.19	2.74±0.29
PUFA/saturated	1.43±0.03	1.34±0.05
EFA (LA+ALA)/non-EFA	0.45±0.01 <sup>***</sup>	0.37±0.01 <sup>***</sup>
EPA/DHA	0.21±0.01 <sup>***</sup>	0.33±0.01
DHA/AA	0.48±0.01 <sup>***</sup>	0.15±0.01
ALA/DHA	0.25±0.11 <sup>***</sup>	1.33±0.17
AA/PA	0.07±0.00	0.03±0.00
n-6/n-3	4.92±0.55 <sup>***</sup>	14.17±0.83

Following the supplementation of group A with n-3 polyunsaturated FA (PUFA) and group B with placebo for a eight-week period, blood was drawn and plasma FA were separated by gas chromatography. FA proportion is expressed as the percentage of the total amount of FA present. FA contents having less than 0.2% of the total have been omitted. Student's t-test (two-tailed) was used to compare differences between means (± SEM).

Table no.2

www.ncbi.nlm.nih.gov/pmc/articles/PMC2661312/table/06.pdf#1140897

FA	Group A	Group B
Total n-3	5.71±0.59	6.37±0.49
Total n-6	39.34±0.83	39.10±0.83
Total n-7	2.06±0.14	2.46±0.10
Total n-9	18.03±0.39	18.13±0.51
Total monoterpenes	0.04±0.04	0.10±0.04
Total sesquiterpenes	0.11±0.01	0.37±0.06
Total monoterpenoids	20.87±0.79	20.99±0.56
Total PUFAs	10.38±1.19	15.30±0.81
Total trans	0.44±0.05	0.49±0.01
18:1 (n-7)/18:2 (n-6)	0.04±0.00	0.04±0.00
18:2 (n-5)/18:4 (n-6)	3.33±0.32	3.42±0.24
20:1 (n-3)/20:4 (n-6)	0.01±0.00	0.01±0.00
24:0/20:0	0.62±0.05	0.61±0.03
24:0/20:0	1.90±0.20	1.91±0.13
PUFA/saturated	0.25±0.01	0.23±0.02
EFA (LA+ALA)/non-EFA	0.48±0.01	0.47±0.02
EPA/DHA	0.25±0.06	0.26±0.03
DHA/AA	0.43±0.04	0.41±0.01
ALA/DHA	0.36±0.01	0.31±0.01
ALA/LA	0.02±0.00	0.02±0.00
n-6/n-3	6.89±0.10	6.73±0.09

Following the supplementation of group A with n-3 polyunsaturated FA (PUFA) for an additional period of eight weeks (16 weeks in total), while group B received n-3 PUFA instead of placebo for eight weeks, blood was drawn and plasma FA were separated by gas chromatography. FA proportion is expressed as the percentage of the total amount of FA present. FA contents having less than 0.2% of the total have been omitted. Student's t-test (two-tailed) was used to compare differences between means (± SEM). AA: Arachidonic acid, ALA: Alpha-linolenic acid, DHA: Docosahexaenoic acid, EFA: Essential FA, EPA: eicosapentaenoic acid, LA: Linoleic acid.

The results of study showed that omega-3 should be given in dietary supplements which helps in maintaining symptoms related to children brain disability such as attention deficit hypersensitivity disorder. Duration of supplementation should also be considered as in many studies, better results were observed with longer supplements administration.

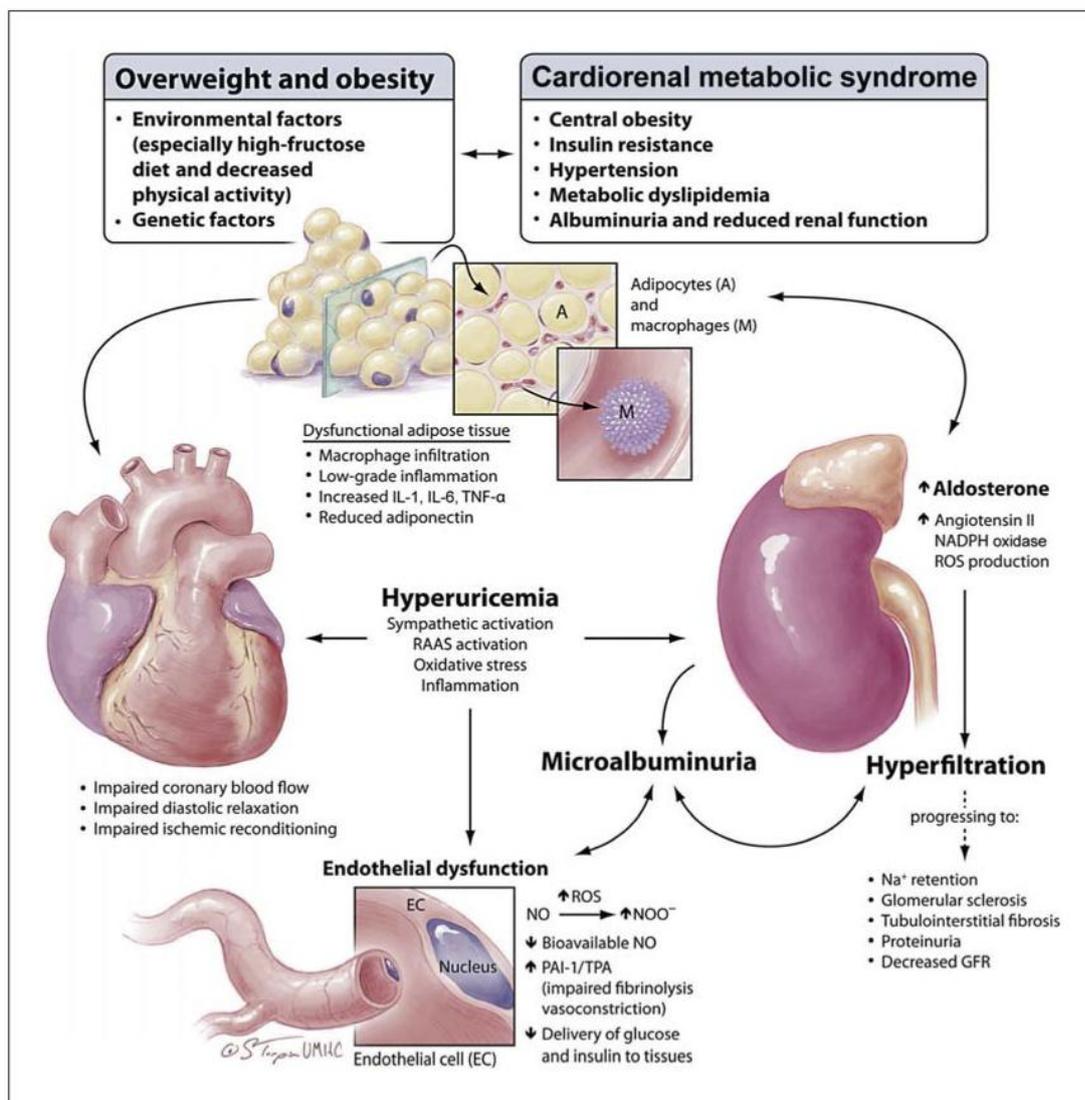


## Reference

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2. Obesity can increase the risk of heart diseases, brain disorder, and kidney damage and defect the immune system.

In today's life style, obesity is common problem. Obesity is a condition caused by an accumulation of excess body fat. It is measured by Body mass index. Overweight or obesity caused many problems related to health. It causes heart problems like coronary heart disease, kidney problem like type-2 diabetes, brain disorders and weak immune system.



Renin angiotensin system (RAS) have important role in regulation of blood pressure, fluid and electrolyte balance. In recent study, RAS is linked with brain, heart, kidney, and adipose tissue. As RAS was found to be increased during obesity. During clinical trials, anti –

hypertensive effects was shown by inhibition of RAS which also provide protection against development of type-2 diabetes. In animal model with targeted inactivation of RAS gene showed improved insulin resistance. Obese patient whose weight problem is associated with uncontrolled carbohydrate intake is linked up with atypical depression. Carbohydrate intake causes release of serotonin in the brain, which has anti depression effect.

Combined weight loss (less calorie diet, physical exercise, no fast food) and agents that deactivate RAS (ACE inhibitors and angiotensin II receptors antagonist) are best option to fight disorders which are caused by obesity such as heart, kidney, brain and weakening immune system.

## Reference

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2. Kollias H., Research Review: High-protein diets – safe for kidneys,  
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