Eating the Rainbow: Micronutrients and Cognitive Change in the General Population and TBI [abstract only]

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Title

Eat the Rainbow: Micronutrients and Cognitive Change in the General Population and TBI.

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Introduction

The impact of poor nutrition on physiological health in the general population is well understood, however less is known about the effects of diet on brain function and cognition and there is little understanding of the role specific micronutrients may play when neurological function is compromised. Essential micronutrients (vitamins, minerals, omega-3 fatty acids) are required by the brain for normal function and for repair; following TBI certain micronutrients are depleted through increased utilisation and through renal clearance, in addition to hypermetabolism of up to 200% of normal. Within hospital individuals' diets are tailored to meet additional requirements following a TBI, however on discharge no dietary advice is given, despite evidence of poor dietary choices following injury as a direct consequence of cognitive deficits.

Method

Sixty healthy adults ($N = 60$) were recruited from the general population, age range 21–59 years, with participants randomly allocated to conditions (multivitamin, vitamin D or vitamin C) in a double-blind protocol. Participants also completed a 14-day food diary to gather information on micronutrient intake. The cognitive test battery included measures of IQ, memory, executive function, and implicit and explicit learning. For the TBI study (ongoing) individuals with mild-moderate deficits 3-24 months post-injury were recruited into a double-blind cross-over study (multivitamin/omega-3) with parallel placebo group. Food diary data was collected, and a similar cognitive test battery administered.

Results

Findings in the normative group showed deficiency in dietary intake of a number of micronutrients, specifically minerals, fat-soluble vitamins and some B-vitamins. Significant improvements were found across groups on a number of measure (visual and verbal memory, processing speed). The Multivitamin group additionally showed significant improvements on visual strategy generation (along with the Vitamin C group), working memory, motor planning and implicit and explicit learning. Preliminary new clinical data from the TBI group will also be presented.

Conclusions

When taken together evidence suggests that sub-optimal micronutrient intake may have a negative effect on cognition across the lifespan, rather than during specific life stages (e.g. development or older age). These findings provide a proof of concept that individuals are not reaching RDI amounts from diet alone, and in those who have graver requirement for optimal micronutrient intake like individuals following a TBI there is the potential that supplementation could support reparative mechanisms and improve cognitive outcome.