

Nutrients and their Effects on Cognition and Traumatic Brain Injury Recovery: A Review of the Literature

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Introduction

- Traumatic brain injury rehabilitation requires consumption of healthy micronutrients and fatty acids (1).
- Important micronutrient include: carbohydrates, proteins, and fats (1).
- Whole diet provides essential molecule synthesis of essential structural cell phospholipids (2).
- Malnourishment and eating disorders can lead to immune suppression, mental depression, and heterogeneous pathophysiological diseases (3).
- Consumption of complex carbohydrates correlates with successful brain aging and improved memory both in the short- and long-term (4.)

Purpose

- To examine the effects of malnourishment and eating disorders.
- To identify potential solutions to improve cognition and quality of life after traumatic brain injury.

Methodology

We conducted a systematic search of studies:

- Search engines: MEDLINE-PubMed, PsychInfo, and CINAHL
- Search dates: 2018 to June 2023
- Keywords: diet, psychology of food, and traumatic brain injury rehabilitation
- 21 eligible publications were used for data abstraction
- 15 articles were included in the analysis



Results

Study Design

- **Cross-sectional analysis**
 - Electronic health records (n=4)
 - Survey (n=5)
- **Intervention**
 - Non-randomized (n=4)
 - Randomized (n=2)

Disciplines

- Clinical Nutrition, Food Sciences an Nutrition Public Health, Molecular Sciences, and Neuropsychology



Memory

Memory and learning deficits are mediated by high-fat/high-sugar diets (5-6)

"Feeding" of the brain leads to better mental health, because the right fuel enables it to perform better all around (7)

Brain derived neutrophil factor (BDNF) is a key molecule involved in synaptic and structural plasticity, learning, and memory (8)

Physical Ability

Malnutrition can increase infection risk and result in poor wound healing, muscle atrophy, and increase the length of mechanical ventilation and admission (9-11)

Brain accounts for only approximately 2% of total body weight. However, it consumes about 20% of the body's energy (12)

Vitamin A deficiencies lead to intellectual impairment, poor growth, perinatal complications, degenerative diseases associated with aging and higher morbidity and mortality (13-15)

Speech

Malnutrition is linked to deficits in memory, visuomotor coordination, and social skills (16-17)

Decreased IQ scores and speech are associated with malnutrition (18)

Brain undergoes multiple changes including increased myelination and configuration of synaptic connections in recovery (19)

Proper nutrition is thought to promote recovery and after brain injury (20)

Conclusions

- There is a direct association between adequate nutrient consumption and cognitive function.
- A nutritious diet leads to rehabilitation and provides essential molecule synthesis of essential structural cell phospholipids.
- Whole food malnourishment and eating disorders can lead to immune suppression, depression, and high rates of heterogeneous pathophysiological diseases.

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References

