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ASSOCIATION OF MICRONUTRIENTS WITH COGNITIVE FUNCTIONS IN CHILDREN WITH LEARNING DISABILITIES

Biochemistry

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ABSTRACT

A cognitive disorder is not a matter of competency or inspiration. Learning disorders are found in many factors involving oral or nonverbal treatment, organization, acquisition, or knowledge utilization. Autistic kids are not stupid or sluggish. All of them are just as intelligent as anyone else. Their minds were only wired differently. At any age, the status of micronutrients can affect cognitive function. Deficiencies of nutrients and trace elements could impair memory, which could lead to the development of learning impairment. Food is a modifiable lifestyle aspect and can be critical to the pathogenesis of learning disability (LD). In the present research, the effect of micronutrients on children's cognitive functions with intellectual difficulties has been explored. In this research, an effort was made to determine the role of nutrients in tracking improvements in children with disabilities and their role in prognosis and management. Our research explicitly demonstrates that micronutrient status is closely correlated with intellectual impairment and nutritional deficit correction after linguistic therapy significantly increases children's learning capability with LD. Although micronutrient deficiencies frequently co-occur in the sense of deprivation, little is understood regarding the effect on cognitive development of multiple micronutrient deficiencies. This study reviews the association between four micronutrient deficits and the cognitive functioning of children.

KEYWORDS

Learning Disability, Nutrition, Cognitive Function, Linguistic Therapy, Micronutrients, Cognitive Development.

INTRODUCTION

At any age, the status of micronutrients can affect cognitive function. Deficiencies of vitamins and trace elements could impair memory, which could lead to the development of learning impairment[1]. Food is a lifestyle aspect that is modifiable and can be crucial to the pathogenesis of LD. Nutrition has been the goal of extensive studies on cognitive ageing and neurodegenerative diseases. Nutrients are bioactive molecules that are essential for human health and are usable. The majority cannot be synthesized by the human body spontaneously and must be extracted from food. Around 30 per cent of stable children have one or more food elements, such as vitamins, that have subclinical malnutrition. In later life, treatment of such deficits may have a role in avoiding or retarding cognitive impairment. Since micronutrients are linked to particular physiological processes, the association between micronutrient deficiency and early cognitive growth has captured recent interest[2]. Therefore, detailed guidelines may be geared at interventions intended to avoid or treat micronutrient deficiencies.

Biochemical studies can help us to understand the connection between specific pattern deficits causing learning disorders[3]. Besides, a helpful guide for the management of learning disabilities can detect biochemical impairments of these anomalies. With poor self-esteem, rage and other concerns, a trained child would suffer. Mental health practitioners can help young people appreciate these symptoms, develop coping skills, and build healthy relationships. Given the relevance and output status of the micronutrients and the lack of definitive studies in this field, it was deemed worthwhile to conduct the study in this area.

The study investigating the influence of micronutrient deficiency on children's cognitive and motor performance suffers from many of the same methodological concerns that have hampered studies exploring the influence of protein-energy deprivation. In the sense of poverty and among families beset by numerous stressors that may conflict with their infants' balanced growth, micronutrient deficiencies frequently occur. Furthermore, deficiencies in micronutrients sometimes co-occur, mainly if the micronutrients are obtained from the same source. For starters, essential sources of iron, zinc and vitamin B-12 include beef, fish and poultry. It may be challenging to understand single micronutrient supplementation trials' results if children lack several micronutrients[4].

Children with and without micronutrient deficits have been contrasted in observational research. While these experiments may offer valuable knowledge on micronutrients and developmental disparities, the rigour of randomized trials is missing since variables vary between the divisions of groups that impact infants' growth, such as care giving activities. Randomized studies may also explain discrepancies due to the impact of micronutrients, but they are costly and may often monitor mitigating factors, such as the care giving community's consistency, that which affects the growth of infants[5].

MATERIALS AND METHODS

At Sevana speech and hearing centre, a case-control analysis was performed for two years. A total of 100 children have been selected for this study. The test sample contains Sixty LD children and forty age and sex-matched controls included in the above criterion Control population contained 6-15 years of age normal children. Children with LD aged 6-15 years are included in the test population. Based on management and evaluation, the test population was further distributed.

The Linguistic Profile Test (LPT) has been used to investigate the functional stages of children with cognitive impairments in the following language components: phonetics, semantics, vocabulary, auditory reception, responsive vocabulary, aural awareness, and verbal speech. Using specific standard methods, biochemical parameters are measured photo-metrically.

RESULT AND DISCUSSION

The study was conducted on 40 control subjects (7.55 ± 1.75) years of age and 60 LD subjects. LD participants have a pre-test age of (7.35 ± 1.68) years and a post-test age (8.35 ± 1.68) years. The height, weight and BMI of the subjects under control are respectively 123.58 ± 7.18 cm, 23.18 ± 5.86 Kg and 14.98 ± 2.46 Kg/m2. Authors found that micronutrients such as vitamin D, C, B vitamins and minerals (Magnesium & Zinc) impact the cognitive functions of children with LD based on this study.

Distribution Mean Of Parameters Among The Control And Test Groups

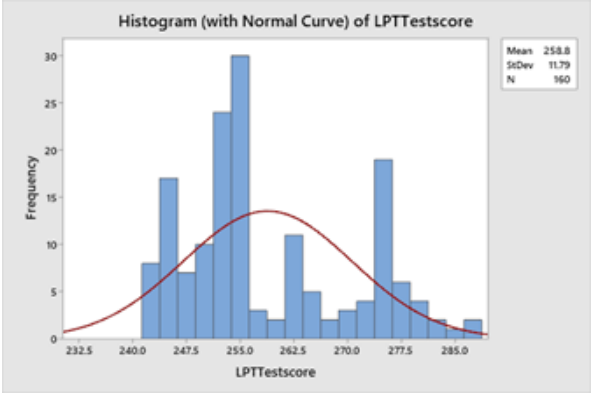
Parameters	Control (n=40)	Pre Treatment (n=60)	Post Treatment (n=60)	p
Age (Yrs)	7.55 ± 1.753	7.35 ± 1.676	8.35 ± 1.676	<0.01**
Height (cm)	123.58± 7.179	122.6 ± 6.551	126.15 ±6.483	<0.01**
Weight (Kg)	23.18 ± 5.857	22.95 ± 5.64	25.1 ± 5.577	0.086
BMI (Kg/m2)	14.98 ± 2.462	15.08 ± 2.392	25.1 ± 5.577	<0.01**
Vitamin D (ng/mL)	32.03 ± 3.704	25.7 ± 4.496	30.25 ± 3.368	<0.01**

Vitamin C (mg/dL)	1.068 ± 0.152	0.658 ± 0.206	0.987 ± 0.178	<0.01**
Folate (ng/mL)	16.56 ± 2.619	14.59 ± 3.061	17.47 ± 2.463	<0.01**
Vitamin B6 (µg/L)	36.3 ± 4.978	22.22 ± 6.707	35.05 ± 5.173	<0.01**
Vitamin (B12ng/dL)	64.88 ± 10.802	46.37 ±12.384	63.78 ±12.571	<0.01**
Magnesium (mg/dL)	1.91 ± 0.1692	1.762 ±0.1223	1.845 ±0.1254	<0.01**
Zinc (µg/dL)	85.98 ± 6.758	66.6 ± 8.718	84.1 ± 7.512	<0.01**
LPT Test score	260.38 ± 10.0	252.97 ± 10.6	263.65 ± 11.6	<0.01**

Distribution Of LPT Test Score Among The Population

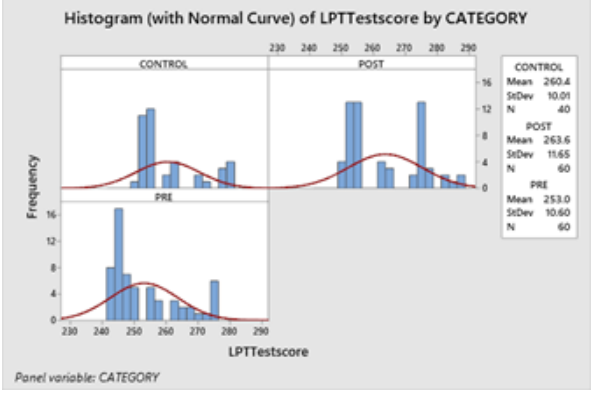
The mean LPT Test score of the study population was 258.82. The mean LPT Test score of control, post-test, and pre-test groups were 260.38, 263.65 and 252.97, respectively.

Variable	Total Count	Mean	StDev
LPT Test score	160	258.82	11.79



Distribution of LPT Test Score Among The Categories

Variable	CATEGORY	Total Count	Mean	StDev
LPT Test score	CONTROL	40	260.38	10.01
	POST	60	263.65	11.65
	PRE	60	252.97	10.60



CONCLUSIONS

The cognitive functions in children with LD are favorably affected by micronutrients such as Vitamin D, C, B vitamins (Folate, B6 & B12) and minerals (Magnesium and Zinc). Correcting dietary deficits during language rehabilitation dramatically increases the capacity of children with LD to read.

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