

TREATMENT OF LEARNING DISABILITIES AND ATTENTION DEFICIT HYPERACTIVITY DISORDER: A CASE STUDY OF OMEGA-3 AND FOLIC ACID (VITAMIN B9)

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Abstract

Concern about interventions has warranted investigations into the cause(s), assessment (diagnosis), treatment, and prevention of learning disabilities (LD) and other mental disabilities. This study investigated diagnosis and treatment of learning disabilities and attention deficit hyperactivity disorder (ADHD) using common vegetables, omega-3 and folic acid (vitamin B9). The aim was to establish the efficacy of orthomolecular therapy in the treatment of children with mental disabilities. The study involved a clinical intervention for 20 of such children, mean age of 12 years, with learning disabilities and ADHD. Analysis of their urine samples was conducted to obtain their trace elemental (biochemical) status using Atomic-Absorption-Electro-Spectrophotometer. Analysis was conducted along the course of treatment at 3 months interval covering a period of 1 year 3 months. Findings established the treatment efficacy using common vegetables, omega-3, and folic acid (vitamin B9) for learning disabilities and ADHD. The study possesses obvious implications for therapeutic interventions and approaches in an inclusive setting.

Introduction

Professionals and researchers will continue to devote attention toward investigations that will serve the best interest in intervention for persons with special needs. The case of individuals with learning disabilities is no exception. Evidence abound as to research priorities, activities, and issues with regard to learning disabilities (LD). Learning disabilities (sometimes called learning disorder) is a classification including several disorders in which a person has difficulty learning in a typical manner, usually caused by an unknown factor(s). An increasing amount of evidence suggests a biochemical basis for the problem – metabolic abnormalities of biogenic amines (including serotonin, dopamine, and norepinephrine) have been of particular interest. The substances are believed to be functionally important to neural transmissions (Osuorji, 2011).

Several, research methods aimed at defining the relationship have been used to investigate cases of learning disabilities, including measurement of urinary and plasma concentrates (Iheanacho, Osuorji & Oyeniran 2004). Research evidence indicates that

biochemical imbalance is common among children with attention deficit hyperactivity disorder which is a sub-type of learning disabilities (Barkley, 1990). Many of such children exhibit protein, calcium, phosphorus, vitamin D, iron, and vitamin A deficiencies regardless of economic status of their families. Among the malnourished who do survive, there is often a transient or permanent impairment, including stunted growth, biochemical developmental delays, and a typical electroencephalographic rhythms. (Iheanacho, Osuorji, & Oyeniran, 2004).

The impact of severe nutritional deprivation during the critical period of neurological development may have a serious, long-term effect on learning. It is therefore, established that nutritional inadequacies are related to inefficient biochemical functioning and thus to an inadequate molecular environment of the brain (Dami, 2004, Orim, 2008) . Evidence from research suggests that imbalance or deficiency can produce psychiatric symptoms, mental and physical retardation, learning disabilities and attention deficit hyperactivity disorder.

The limited research literature on social skills deficits in learning disabilities and ADHD focuses on the major hypotheses that attempts to explain the nature of social skills (Forness & Karale, 1991). Among such hypotheses is that social skills deficits are posited to be a consequence of the neurological dysfunction presumed to underlie a child's academic skills deficits (Osuorji, 2011). The difference in social skills may occur because of the nature of certain children with learning disabilities who have other diagnoses such as ADHD. The issue of learning disabilities with ADHD has not been widely explored.

Statement of the Problem

The behavioural relationships and nutritional needs build a case for an intervention approach that is initially termed megavitamin treatment but has been renamed orthomolecular therapy. This is defined as "treatment of mental dysfunction by providing for the optimum molecular composition of the brain, especially the optimum concentration of substances normally present in the human body. There is need to investigate the extent to which orthomolecular therapy remains effective toward the treatment of learning disabilities and other related mental disabilities.

The research here aimed at investigating the efficacy of Omega-3 and folic acid in the treatment of children with learning disabilities.

Many scientists believe the fact that a deficiency or excess in trace elements and vitamins in the body will result to an abnormality in learning and behaviour patterns, including those of children with learning disabilities and ADHD. What needs to be clarified is the challenge of establishing the efficacy of the intervention programme since orthomolecular therapy itself remains controversial. Authorities have tried to identify several doubts in the theory questioning whether a vitamin deficient subgroup is likely to withstand natural selection of evaluation and pointing to the absence of valid pretreatment diagnostic procedure (Osuorji, 2011). Another question that needs to be

answered is whether the large doses of vitamins recommended in the therapy are harmful? Specific therapies, as this are not sufficiently documented. This therefore, poses a great challenge to researchers and professionals alike (Iheanacho, Osuorji, & Oyeniran, 2004).

Research Question

Only one research question is stated for the study :

1. To what extent can Omega -3 and folic acid therapy be found effective in the treatment of children with learning disabilities and attention deficit hyperactivity disorder?

Method and Procedure

Research Design

The study involved a differential diagnosis which was carried out under a clinical setting. The centre is essentially an intervention outfit for all cases of learning disabilities including those with ADHD. There were over 300 of such children and youth with learning disabilities and ADHD by the period this study was conducted in October, 2011). The study involved pre-treatment test, proximate-test, post-treatment-test design.

Sampling

Twenty children of mean age, 12 years with learning disabilities and ADHD, were randomly selected from population of eighty of such cases attending clinic at the moment of this study. This was after obtaining permission from the authorities of the centre, and due consent of the parents. Data were collected on all the sample of the study concerning: generic variations, biochemical factors, events in the pre to perinatal period, postnatal development and other subsequent events resulting in neurological impairment.

Procedure

Assessment involved the trace elemental analysis with urine sample of the children using Atomic Absorption Electro-Spectrophotometer. The aim was to determine not only the pre-treatment diagnostic procedures, but the trace elemental and vitamin levels as informed by the biochemical (orthomolecular) status of the children. The treatment pattern was informed and guided by the results of the analyses for the identified children.

Treatment commenced immediately following the pre-treatment test (urine analysis) for each child. Nigerian common vegetables: bitter leaf, pumpkin leaf and spinach were used and supported with trace elemental and vitamin supplements, which were specifically applied in line with the results of the analysis and according to specifications.

The treatment which lasted for fifteen months was segmented at three months intervals covering five segment periods. A proximate test (analysis) concluded, and started another treatment for the next quarter. A total number of five test-analyses

including the initial assessment were conducted during the intervention period. The post treatment-test analysis (transferred test) was carried out after six months the intervention stopped.

Result

Table 1. Summary of Urine Analysis for Pretest Intervention – Posttest

S/N	Element components	1 st Result		2 nd Result		3 rd Result		4 th Result		5 th Result		Post – treatment result	
		Status	Gain	Status	Gain	Status	Gain	Status	Gain	Status	Gain	Status	Gain
1	Sodium (Na)	118.05	-	120.10	2.05	122.36	2.21	125.29	0.93	129.68	4.39	120.60	-9.08
2	Potassium (K)	18.68	-	18.69	1.00	18.70	1.00	19.49	0.79	18.96	0.50	17.69	-1.27
3	Calcium (Ca)	0.75	-	0.77	0.02	0.79	0.02	0.86	0.07	0.98	0.12	0.87	0.11
4	Magnesium (mg)	6.03	-	6.05	0.02	6.15	0.20	6.21	0.06	6.31	0.10	6.12	-0.19
5	Iron (fe)	Ne	-	Ne	-	0.001	0.001	0.001	0.000	0.001	0.000	0.001	0.000
6	Manganese (Mn)	Ne	-	0.001	0.001	0.002	0.001	0.002	0.000	0.002	0.000	0.002	0.000
7	Zinc (Zn)	0.035	-	0.050	0.015	0.50	0.00	0.053	0.003	0.051	0.001	0.012	-0.039
8	Lead (pb)	ND	-	ND	-	ND	-	ND	-	ND	-	ND	-
9	Cadmium (Cd)	ND	-	ND	-	ND	-	ND	-	ND	-	ND	-
10	Copper (cu)	ND	-	ND	-	ND	-	ND	-	ND	-	ND	-

Table 1 shows the summary results of pre-test, intervention and post-test average urine analysis for the research sample involved in the study. Following the results as presented in the table, it appears the treatment using omega-3 and folic acid (vitamins B9) supplements along common Nigerian vegetables of bitter leaf, pumpkin leaf and spinach, for children with learning disabilities and ADHD is effective. The biochemical

status results of analysis in the 1st result shows the deficiency levels of elemental components which include: sodium, potassium, calcium, magnesium and zinc. Those that were not present (Ne) in the pre-treatment test analysis include iron, and manganese, while lead, cadmium and copper were not found with urine analysis (ND).

The results of 2nd to 5th analyses are very remarkable and significant. A general but gradual increase in the biochemical status are observed across the segmented periods of treatment and analysis. A comfortable gain is observed along the elemental components including those of iron and manganese that were not present in the pre-treatment analysis. Lead, cadmium and copper remained not detected (ND).

Of remarkable note is the post-treatment analysis results (see table 1, last column). These results indicate the difference between the last intervention test results and those of the transferred test which analysis was done six months after intervention has stopped. The relevant point is that the appreciated trace elemental status still sustains even six months after treatment. Registered post-test result gains for iron and manganese that is "0" in each case should be seen as normal. The treatment test results along the elemental components suggest that increase in the biochemical status was due to treatment. To this extent, the treatment of learning disabilities with ADHD involving omega-3 and folic acid (vitamin B9) is considered effective.

Discussion

The findings of the study being reported are similar to those in other investigations. There is good reason for including (leafy) green vegetables of bitter leaf, pumpkin leaf and spinach. These green vegetables are mostly the natural sources of folic acid or folate which is vitamin B9. Even with women of child bearing age, an intake daily prior to conception and during early pregnancy, the risk that the child will be born with serious neural tube defect (a birth defect involving incomplete development of the brain and spinal cord) is reduced by as much as to 70 percent(Osuorji, 2011)

Deficiency of vitamin B9 or folic acid in a child leads to anencephaly, severe underdevelopment of the brain and encephalocele, when the brain tissue protrudes out to the skin from an abnormal opening in the skull. Benefits of omega-3 with folic acid can never be underestimated. Omega-3 ADHD comprises: fatty acids (including docosahexaenoic acid =DHA, and important nutrients such as chro tene, vitamin B1, B2, B6, B12, C, D3, E, folic acid, iron, selenium, zinc, manganese, etc. Inadequate amounts is correlated with impaired learning disabilities, poor ... , ADHD, behavioural problems and abnormal vision (Osuorji, 2011, Orim, 2008, Dami, 2004). Adequate intake of omega-3 and with folic acid (vitamin B9) prevent deficiency states, anaemia, and all the related cases of learning disabilities and ADHD (Dami, 2004).

Orim (2008) points out that some of the vitamin and mineral substances are essential for brain development and normal functioning, where as with deficiency, the resultant effect is brain dysfunction associated with learning disabilities and ADHD, McGee (2007) reporting on the functions of vitamins indicates that vitamin B6, B12, B9

(folic acid, and vitamin B1 (Thiamine) as important in the normal development and functioning of the brain, or the central nervous system. This is as these B vitamins remain essential for the treatment of learning disabilities and attention deficit, hyperactivity disorder (LD and ADHD).

Recommendation

The nature of the investigation and study findings inform the following recommendations.

1. The study was carried out in a clinical setting, which suggests a typical laboratory research that needs replication. There should therefore, be more work on the study involving a wider population and field environment.
2. Urine sample analysis is a major specimen for the research and this has remained effective in tracking the trace elemental components and vitamin (biochemical) status of such children with learning disabilities and ADHD. The study should be an ongoing investigation as to determine the specific cause of the problem, which will target the prevention of learning disabilities and ADHD.
3. The study period for the investigation was one year and three months. More time should be required for the study to yield better results as more information is needed on the efficacy of orthomolecular therapy and the use of trace minerals and vitamins in the treatment of learning disabilities and other related mental disabilities.

Conclusion

The best mainstream research reflecting the consensus of experts indicates that most longstanding difficulties in defining and treating learning disabilities stem from inaccurate assumptions about their causes and characteristics. From the study conducted, a specific direction has been provided toward investigating the cause from maladjustments and imbalances in biochemical status of the child with learning disabilities and efficacy of treatment involving the use of trace minerals and vitamin components.

Findings of the study established the efficacy of omega-3 and folic acid (vitamin B9) in the treatment of learning disabilities with ADHD. The past two decades have seen unprecedented developments in the area of intervention technology, targeting the cause(s), assessment (diagnosis), treatment and prevention of learning disabilities. The study possesses obvious implications for therapeutic interventions and approaches for cases of learning disabilities in an inclusive setting.

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