Vitamin B₆-magnesium treatment for autism: the current status of the research

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In 2005, a systematic review was published by the Cochrane Collaboration that reviewed the effects of vitamin B₆-magnesium (vit B₆-Mg) treatment for autism [1]. The focus of the review was to assess the impact of vit B₆-Mg for improving the communication and behavioural responses of children and adults with autism. The review summarized and synthesized only studies that reported randomized controlled trial (RCT) research designs as the basis for determining the efficacy of the treatment. The primary conclusion drawn from this review was that there was insufficient evidence to warrant the advocacy of vit B₆-Mg as a treatment to improve communication and behaviour of individuals with autism. However, with the continued interest in the use of the vitamin vit B₆-Mg as a treatment protocol, the purpose of this paper is to provide a brief update to the Cochrane review using the same standards of study inclusion, information retrieval, data extraction, and analysis as presented by Nye and Brice [1].

Updated review

For the Cochrane review [1] a total of five databases were searched. All studies meeting their inclusion criteria were retrieved from three databases: MEDLINE, ERIC, and PsycINFO. For this update, a new search was conducted using those three databases along with the same key terms and included the years January 2005 through March 2010. A total of 154 titles/abstract citations were retrieved and evaluated for potential inclusion (MEDLINE = 128, ERIC = 4, PsycINFO = 22) of which 144 citations were excluded due to non-RCT design reports, the absence of outcomes associated with communication and behaviour, or participants were not diagnosed with autism spectrum disorder (ASD). Thus a total of, ten citations appeared to potentially meet inclusion criteria and a full-text of each study was obtained for further analysis.

A review of the full text of these studies resulted in the exclusion of seven studies. Two of the seven studies [2, 3] measured the level of vit B₆ in the plasma of children with ASD and typically developing peers who were not taking supplements. A third, [4] compared the macro- and micro-nutrients consumed from three-day diet records of children with ASD and their typically developing peers. A fourth study [5] reported a vit B₆-Mg treatment study in which participants were diagnosed with Attention Deficit Hyperactivity Disorders (ADHD) rather than autism spectrum disorder. The fifth study retrieved reviewed nutritional and environmental approaches to treating ASD and ADHD [6] while a sixth study reviewed alternative intervention approaches to autism [7]. A seventh study [8] reported on a survey of 19 parents of children with ASD to assess their satisfaction with the vit B₆-Mg treatment for their child.

Of the three remaining studies, two were narrative summaries of alternative treatments of autism [9, 10]. Wallace [10] supported the lack of efficacy of vitamin vit B₆-Mg treatments but did not provide any new research in the area. Rossignol [9] summarized several novel and emerging treatments in ASD including vit B₆-Mg treatment. Each treatment was given a grade according to the research evidence, which supported its effectiveness. The specific
review of vit B₆-Mg treatment was given a grade of “C” because it was either supported by at least one nonrandomized controlled trial or at least two case studies. The review included a discussion of the Nye and Brice review [1] but supported evidence of effectiveness with the Mousain-Bosc et al. [5] study cited above. It should be noted, as discussed above, the participants in the Mousain-Bosc et al. [5] study were not diagnosed with ASD; therefore, any comparison across studies would be inappropriate.

Only one of the articles retrieved at the full-text stage reported an RCT design that investigated the effect of B₆-Mg on the behaviour of persons with ASD [11]. A summary of this study follows.

**Review of intervention studies**

Adams and Holloway [11] investigated the levels of vitamin B₆, vitamin C, and alpha lipoic acid in 25 children three to eight years of age and diagnosed with autism spectrum disorder (ASD). The purpose of this study was to determine whether a moderate dose of a multivitamin/mineral supplement was effective in reducing symptoms associated with ASD. Children included in the study demonstrated no changes in any treatment therapies for the two months preceding the intervention phase of the study, and none of the participants were currently taking a multivitamin or mineral supplement. A total of 25 children met the inclusion criteria for enrollment in the study. Participants were matched in pairs by sex and age and randomly assigned to the intervention or control group. Precisely how this was accomplished was unclear due to the odd number of participants qualifying for study inclusion. Five of the participants did not complete the study – three children in the control group and two in the intervention group leaving a final sample size of n = 9 in the control and n = 11 in the treatment group for which data were provided.

Participants in the intervention group initially received Spectrum Support II (SSII) vitamin supplement at 1/8 of the dose, which was increased linearly over 24 days to the maximum dose of SSII. The maximum dosage was held constant until day 34. From days 35-50, the participants in the treatment group were gradually transitioned to Spectrum Support III (SSIII), which continued until day 90 at the same level. Participants were given a daily intake of 3 mL/22.3 kg (5 pounds) bodyweight. Participants in the control group received a placebo designed to look identical to the actual supplement.

To assess the impact of the vit B₆-Mg treatment for communication and behaviour, mothers of the children in both groups completed a global impressions survey to evaluate changes in their child's behaviour at the conclusion of the intervention. Mothers of children in the intervention group reported statistically significant improvements in sleep and gastrointestinal symptoms (p < 0.05). Measures of expressive and receptive language, general behaviour, eye contact, and sociability all yielded statistically non-significant (p > 0.05) differences between treatment and control participants.

The findings are consistent with the results reported by Nye and Brice [1]. However, methodological short-comings of the study make interpretation of the results problematic on several accounts:

- the method of group assignment of participants is unclear,
- the RCT design was compromised due to differential group dropout rates and a failure to utilize appropriate statistical procedures.

**Conclusion**

While Adams and Holloway [11] met the same inclusion criteria used by Nye and Brice [1], the measures of communication and behaviour change were accomplished by the indirect measurement of a parent survey. The methodological issues of the study limit the robustness of the results and their interpretation for other children diagnosed with ASD. Overall, these data can at best be seen as consistent with the Nye and Brice review/conclusions and at worst these data do not contribute any new findings to the existing literature.

Taken as a whole, the research reported since 2005 support the original conclusions of Nye and Brice [1], “Due to the small number of studies, the methodological quality of studies, and small sample sizes, no recommendation can be advanced based on this review regarding the use of B₆-Mg as a treatment for autism. There is simply not sufficient evidence to demonstrate treatment efficacy”.

**References**


