

Abstract

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The impact of an 8 month multivitamin intervention on B-vitamin biomarker status and mental wellbeing in healthy adults: Results from a pilot study

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Mental health disorders including depression and anxiety are major contributors to global disease burden. Evidence indicates that nutrition may play a role in supporting mental health, with most investigations centred on one-carbon metabolism related B-vitamins⁽¹⁾. Recently it has been reported that polyphenol supplementation, particularly those high in anthocyanins (such as blueberries) may improve mood states, including depressive symptoms and anxiety⁽²⁾. This pilot study aimed to investigate the influence of a combined multivitamin and blueberry extract multinutrient (Vitals+, Heights, UK) on B-vitamin biomarkers and mental wellbeing in healthy adults.

14 healthy adults (8 males, mean age \pm SD 38 \pm 10 yrs) were recruited. Exclusion criteria were: coeliac disease, mental health condition, pregnancy or breastfeeding or taking nutritional supplements in the past 3 months. Participants received an 8-month supplementation of Vitals+ once a day. The supplement contained, among other nutrients, thiamine (B1), riboflavin (B2) and vitamin B6 at a dose of 30mg each, 500 μ g of 5-Methyltetrahydrofolate (B9) and 25 μ g methylcobalamin (B12) alongside 80mg blueberry extract. B-vitamin biomarker status and mental state were assessed pre-post intervention.

Functional biomarkers of vitamin B1, B2 and B6 were measured using the Erythrocyte Transketolase (ETKac), Erythrocyte Glutathione Reductase (EGRac) and Erythrocyte Glutamic Oxaloacetic Trans-aminase (EGOTac) activation coefficient assays, respectively. Folate was measured in red blood cells (RBCF) and holotranscobalamin in serum was utilised for B12 assessment. Mental wellbeing was assessed using three validated questionnaires: the Profile of Mood States (POMS), Perceived Stress Scale (PSS) and the General Health Questionnaire-12 (GHQ-12). Differences in outcome measure were assessed pre-post intervention using paired samples t-tests ($p < 0.05$ was considered significant).

At baseline 71% of participants had suboptimal/deficient thiamine status ($ETKac \leq 1.25$) whereas 50% were riboflavin deficient ($EGRac \geq 1.40$). Mean values \pm SD for EGOTac, RBCF and holotranscobalamin were above the threshold for deficiencies, (1.37 \pm 0.12), (654 \pm 203 nmol/L) and (70 \pm 35 pmol/L) respectively, with no cases of deficiency for these nutrients. There was a significant improvement in thiamine ($p = 0.024$), riboflavin ($p < 0.001$), folate ($p < 0.001$) and B12 ($p = 0.021$) status post intervention but no change in vitamin B6 ($p = 0.167$) biomarker status. For mental wellbeing outcomes, a trend towards significant improvement by 4-points was reported in the GHQ-12 ($p = 0.062$), with a 30% reduction in participants fulfilling the criteria suggestive of psychological distress. There was no significant change in PSS ($p = 0.179$) or total POMS ($p = 0.167$). However, when subdomains of POMS were investigated, significant decreases in fatigue ($p = 0.028$), confusion ($p = 0.017$), self-esteem ($p = 0.022$) and tension ($p = 0.047$) were observed.

At baseline B6, folate and B12 status was adequate however thiamine and riboflavin deficiencies were prevalent. Vitals+ normalised thiamine and riboflavin status and further improved biomarker status of other one-carbon metabolism related B-vitamins. The multinutrient may present an easily accessible intervention to improve B-vitamin status and mental health and wellbeing in adults.

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References

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