

CORRELATIONS AMONGST MENTAL HEALTH, COGNITIVE FLEXIBILITY, AND ZINC STATUS

Emily Macphail^{1,2}, Richard Dyck²

¹O'Brien Centre for the Bachelor of Health Sciences, University of Calgary,

²Hotchkiss Brain Institute, University of Calgary

ecmmacph@ucalgary.ca

INTRODUCTION

Anorexia nervosa (AN) is an eating disorder with an estimated population prevalence of 0.3-1.2% and is diagnosed in a ratio of 9:1 for women versus men [1,2]. Cognitive flexibility impairment has been observed in both AN and commonly comorbid disorders (e.g. depression, anxiety, obsessive compulsive disorder), as have symptoms overlapping with those of zinc depletion [3,4,5]. Zinc depletion and AN risk groups also have distinct overlap, and zinc has been found to play a role in neuroplasticity, which affects cognitive flexibility [6]. Zinc supplementation has shown benefit in AN treatment, however the mechanisms for this benefit are unclear and have not been explored in detail.

The primary aim was to investigate correlations amongst mental health status, cognitive flexibility, and zinc status in order to better understand whether zinc supplementation benefits in anorexia nervosa (AN) are due to metabolic alterations or to mental health changes which in turn impact behaviour. It was hypothesized that lower zinc status would be associated with decreased cognitive flexibility measures and increased depressive, anxiety, obsessive compulsive, and eating disorder symptoms. The secondary aim was to better characterize the Bryce-Smith zinc taste test (ZTT) in order to understand its potential as a clinical measurement method for zinc status. It was hypothesized that ZTT results would positively correlate with reported seasoning usage and reported zinc depletion symptoms.

METHODS

Participants were recruited via the University of Calgary's Department of Psychology Research Participation System. The Perceived Stress Scale (PSS), Mental Health Inventory-38 (MHI-38) anxiety subscale, Inventory of Depressive Symptoms-SR₃₀, (IDS-SR₃₀), Compulsiveness Inventory (CI), Obsessive Compulsive Inventory-R (OCI-R), and Eating Attitudes Test-26 (EAT-26) were administered to quantify mental health status, while Trail Making Tests (TMT) A/B, Berg's Card Sorting Test (BCST), and the Haptic Illusion test measured cognitive flexibility. The ZTT and a zinc-related factors questionnaire were used to measure zinc status.

RESULTS

12 females aged 18-27 were tested and results analyzed using Spearman's and Mann-Whitney U tests. No significant correlations were found between ZTT scores and measures. Positive correlations with ZTT score were seen for CI, OCI-R, and EAT-26 scores, and for haptic illusions experienced. Inverse correlations with ZTT score were seen for BMI, PSS, MHI-38, and IDS-SR₃₀ scores, TMT completion time difference, BCST perseveration measures, and zinc depletion symptoms. 58.3% of participants had a score of "2" on the ZTT, despite their varying taste and time descriptions.

DISCUSSION AND CONCLUSIONS

The majority of correlations of measures with ZTT scores were as hypothesized, though not all were. The ZTT score distribution was relatively similar to those found in previous studies; however available comparator data is limited and complicated by design differences.

Based on the direction of the observed trends but non-significant results, it is recommended that the study by extended in order to increase sample size and diversity for a more representative outcome. Due to difficulties in zinc status comparison for characterizing ZTT results, it is also proposed that either a rough estimate of intake of high-zinc foods or another measure of zinc status be implemented to improve the utility and accuracy of comparisons.

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