proceedings

MDPI

Abstract

Preliminary Prevalence of Vitamin D and Iron Deficiency in Healthy Primary School Children †

Emily Royle *, Kirsty Pourshahidi, Emeir McSorley and Pamela Magee

Nutrition Innovation Centre for Food and Health (NICHE), Ulster University, Coleraine BT52 1SA, UK; k.pourshahidi@ulster.ac.uk (K.P.); em.mcsorley@ulster.ac.uk (E.M.); pj.magee@ulster.ac.uk (P.M.)

* Correspondence: royle-e@ulster.ac.uk

† Presented at the 14th European Nutrition Conference FENS 2023, Belgrade, Serbia, 14–17 November 2023.

Abstract: Nutritional deficiencies in iron and vitamin D are common in children at a global level, albeit they can be overlooked in apparently healthy children. Iron deficiency in children has been associated with a higher prevalence of vitamin D deficiency, although it is unclear which deficiency has the greater effect on the other, owing to the different metabolic fates of each nutrient. Iron is required in the second hydroxylation step in conversion of 25-hydroxyvitamin D (25[OH]D) to the active form, 1,25(OH)2D, whereas sufficient vitamin D status may lower the risk of anaemia through a reduction of inflammation. This study examined the differences between sufficient and insufficient/deficient 25[OH]D concentrations and haemoglobin concentrations in a child cohort. Vitamin D status [plasma 25(OH)D] was determined using Liquid Chromatography Tandem Mass Spectrometry from samples collected between November 2019–February 2023. Complete blood counts were conducted using a Sysmex automated analyser to determine the haemoglobin status. Non-anaemia was defined as haemoglobin concentrations ≥115 g/L (4). Anthropometric measurements were also recorded, including height (cm) and weight (kg). A Mann–Whitney U test was conducted to assess the differences in haemoglobin concentrations between vitamin D sufficient (>50 nmol/L), insufficient (25–50 nmol/L), and deficient (≤25 nmol/L) participants. Due to numerical constraints, deficient and insufficient children were grouped together as non-sufficient. A total of 159 children aged 4–11 years were enrolled on the study. The median (IQR) age was 8 (7) years, and 52% were female. Plasma 25(OH)D concentrations ranged between 21.31 and 141.11 nmol/L. Whole blood haemoglobin concentrations ranged between 101.0 and 158.0 g/L. Overall, 3% (n = 5) of children were classed as iron-deficient anaemic, 1.9% (n = 3) and 28.9% (n = 46) were vitamin D deficient and insufficient, respectively. Haemoglobin concentrations in vitamin D sufficient (median 130.0 g/L) and non-sufficient children (median = 128.5 g/L) were not statistically different (U = 2685, z = 2685, p = 0.970). These preliminary results suggest that vitamin D and haemoglobin concentrations were predominantly sufficient in this cohort of children. Close to one third of participants had an inadequate vitamin D status, and thus this may explain why no differences in haemoglobin concentrations were observed according to vitamin D status.

Keywords: vitamin D; children; iron; insufficiency; haemoglobin

Citation: Royle, E.; Pourshahidi, K.; McSorley, E.; Magee, P. Preliminary Prevalence of Vitamin D and Iron Deficiency in Healthy Primary School Children. *Proceedings* **2023**, *91*, 409. https://doi.org/10.3390/proceedings2023091409

Academic Editors: Sladjana Sobajic and Philip Calder

Published: 14 March 2024

Author Contributions: Conceptualization, P.M, E.M. and K.P.; methodology, P.M., E.M. and K.P.; formal analysis, E.R.; performed the statistical analysis, E.R.; investigation, E.R., P.M., E.M. and K.P.; data curation, E.R.; writing—original draft preparation, E.R.; writing—review and editing, E.R., P.M., E.M. and K.P.; supervision, P.M., E.M. and K.P.; project administration, E.R. All authors have read and agreed to the published version of the manuscript.

Funding: The work was supported by the department for the economy research scholarship.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of Ulster University (D-VinCHI study REC/19/0069 and 31/10/2019).

Informed Consent Statement: Informed consent and assent was obtained from all subjects involved in the study.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors on request.

Conflicts of Interest: The authors declare no conflict of interest.