



## The effect of motivation type on intake and nutritional status of vitamin B12, omega-3 fatty acids, iron and nutrition knowledge in individuals following a vegan diet

R. Pearce<sup>1</sup>, C. Conlon<sup>1</sup>, K. Beck<sup>1</sup>, K. Mumme<sup>1</sup>, H. Mazahery<sup>2</sup>, R. Batty<sup>1</sup> and P. von Hurst<sup>1</sup>  
<sup>1</sup>*School of Sport, Exercise and Nutrition, College of Health, Massey University, East Precinct Albany Expressway, SH17, Albany, Auckland 0632*  
<sup>2</sup>*Curtin School of Population Health, Curtin University, Perth, Western Australia, Kent St, Bentley WA 6102*

The fundamental principle of veganism is to avoid all possible animal exploitation and therefore, animal ethics has always been a primary motivator. Nowadays, the environment and health are also common motivators. Omission of all animal products leads to dietary exclusion of vitamin B12, limited intake of omega-3 fatty acids, specifically EPA and DHA, and intake of low bioavailable iron sources<sup>1</sup>. Obtaining the knowledge to appropriately plan and replace nutrients through food or supplementation is key to avoiding deficiencies and subsequent consequences. This study aimed to determine the effect of motivation for being vegan on intake of key nutrients and nutritional knowledge. This cross-sectional, observational study recruited participants, who had followed a vegan diet for minimum 2 years. Demographics and nutrition knowledge were obtained from questionnaires. Motivation type was determined using the validated vegetarian eating motives inventory (VEMI) – participants scored the importance of animal ethic, environment and health. Intakes of vitamin B12 and iron, were collected using a 4-day food diary and assessed against Estimated Average Requirement (EAR). Blood samples were taken to determine status of vitamin B12, haemoglobin, serum ferritin, and omega-3 index. Omega-3 index score  $\leq 4$  indicates increased risk of coronary heart disease. Animal ethics was the greatest motivator to become vegan, with 83.5% of participants scoring it as very important, compared to 71.7% of people stating the environment, and 53.3% stating health. No association was found between all motivation types and intake of vitamin B12 and iron, nor omega-3 index. Mean vitamin B12 intake (supplements excluded) of  $2.11 \mu\text{g}/\text{day} \pm 3.43$  exceeded the EAR of  $2.0 \mu\text{g}/\text{day}$  for both men and women, however intakes ranged between 0.00 and  $37.63 \mu\text{g}/\text{day}$ . Mean intake of iron ( $18.77 \text{mg}/\text{day}$ ) exceeded the EAR for both men and women. Overall mean omega-3 index was 3.16%. Both men ( $162.24 \text{g}/\text{L}$ ) and women ( $151.44 \text{g}/\text{L}$ ) had adequate mean Hb serum concentrations. Mean serum ferritin was within normal range for both men ( $64.86 \mu\text{g}/\text{L} \pm 43.48$ ) and women ( $32.55 \mu\text{g}/\text{L} \pm 26.04$ ). Overall mean serum vitamin B12 was within normal range ( $316.54 \text{pmol}/\text{L} \pm 146.18$ ), however a large range was observed from  $72.00 \text{pmol}/\text{L}$  to  $1,015 \text{pmol}/\text{L}$ . Males and females had similar knowledge, with only one question regarding fibre content in cornflakes found to be significantly different ( $P = 0.012$ ). Knowledge was varied e.g., 100% of participants could identify that pasta was a carbohydrate source, yet could not identify which fats are most important to reduce. Mean vitamin B12 intake exceeding EAR and normal status despite limited vegan sources, indicates high consumption of high bioavailable fortified foods, and supplementation. Iron status shows large consumption of iron rich foods to overcome bioavailability issues, reflected by adequate iron intake, after increasing EAR by 80% to meet recommendations. The mean omega-3 index shows a low cardioprotective omega-3 fatty acid intake.

**Keywords:** vegan; motivation; nutrients; knowledge

### Ethics Declaration

Yes

### Financial Support

This work was supported by the Lottery Health Grant (LHR-2022-185693).

### Reference

1. Key TJ, Appleby PN, & Rosell MS (2006) *Proceedings of the Nutrition Society* 65(1), 35–41.