



## ROYAL ACADEMY OF MEDICINE OF BELGIUM

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### **Clarification on the vegetalian diet for children, pregnant and breastfeeding women.**

The opinion of the Royal Academy of Medicine of Belgium (ARMB) on vegan diets (also known as exclusive vegetarian, devoid of products of animal origin such as honey, milk, eggs, etc.) has generated many comments. The Academy has not issued any criticism concerning a vegetarian diet. It was, in fact, the opinion on a vegan diet during pregnancy, breastfeeding and infancy that has provoked the controversy. The ARMB does not dispute that this type of nutrition can modify the incidence of some diseases (metabolic syndrome, diabetes, cardiovascular disease and some types of cancer). Nor does it dispute the benefits of balanced, diversified diets, of course for people who are properly informed.

During pregnancy, balanced maternal nutrition is essential for both the health of the mother and of the foetus. Vegan diets require the future parents to have accurate information and precise monitoring, as well as suitable supplements to prevent, as far as possible, deficiencies, imbalances, and problems particularly in the child's growth.

These are the reasons why the German Nutrition Society (DGE) advises against a vegan diet during pregnancy, breastfeeding, childhood and even adolescence (1). The European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) also warns future parents of the dangers and consequences for the child's health (2 see the appendix).

In some cases described in the medical literature (3-21), these diets result in medical complications, including intra-uterine and post-natal growth retardation, phosphocalcic metabolism disorders with associated bone mineralisation defects and rickets (35), hypothyroidism from lack of iodine, a break in the height-weight curve, an intestinal obstruction with bezoard, severe anaemia, and a Vitamin B12 deficiency, which causes exposure to the risk of development retardation, intellectual disability and an increased risk of disorders such as autism (31). Furthermore, these vegan diets decrease the development of the muscle mass (32). These deficiencies are legitimate considerations for paediatricians. Some organisations recommend medical supervision and the performance of regular blood tests in the critical periods of pregnancy, breastfeeding and early childhood (2).

The U.S. Department of Health and Human Services, the U.S. Department of Agriculture, and the Academy of Nutrition and Dietetics (AND) do not prohibit vegan diets during pregnancy and breastfeeding, but they recommend diversification of consumption, information for parents,

training of professionals and supplementation with Vitamin B12, Vitamin D, zinc, polyunsaturated fatty acids (EPA/DHA),  $\omega$ -3, iron, calcium, iodine, and choline (22-24).

The National Health Service (NHS) in Great Britain writes that “*the guide for healthy nutrition applies to vegetarians, vegans and populations of any ethnic origin*” (...) *The only group for which these recommendations are inappropriate is that of children < 2 years old who have different needs*” (25). Similarly, it has established recommendations concerning the age from which a vegan diet is danger-free (26).

Some people regret the fact that the opinion of the Royal Academy of Medicine of Belgium differs from the conclusion of the AND. They trivialise supplementations, neglect the importance of professional training and the necessary detailed information to be given to pregnant women by dieticians specialised in paediatrics or by obstetricians and paediatricians. 50% of British women have a Vitamin B12 deficiency (7, 8- Table I) leading to exposure to the risk of anaemia, development retardation, intellectual disability and increased risk of disorders such as autism (31).

The epidemiological studies, AHS-2 (71,751 American subjects) and Epic-Oxford (65,429 British subjects), show that more than 50% of vegan adults absorb insufficient quantities or none at all for certain nutrients (DHA) and a fraction of them have abnormally low levels of Vitamin B12 and Vitamin D (27, 28 Table I). Deficiencies are more frequent in Europe because the supplementation of many foodstuffs with vitamins and minerals in the USA (and maybe a higher consumption of nuts) explains why American vegans have considerably higher plasma concentrations of vitamins, iron, zinc and magnesium, than their English counterparts (Table I-30). Despite vitamin and mineral supplementation in 61% of British women, the daily intakes of Vitamin B12, calcium, Vitamin D, 25-OH Vitamin D, retinol, DHA, calcium, zinc and iron is, on average, below the daily requirements. These differences depending on the countries in which the epidemiological studies were conducted were not taken into account by the people who are contesting the Academy’s opinion. They indicate that the US data cannot necessarily be transferred to the French-speaking Belgian population for whom this opinion is intended.

Finally, Picolli’s review, (4) based on 262 articles, concludes that the proof of the impact of vegan diets during pregnancy is limited and heterogeneous. The authors specify that they have routinely eliminated articles describing the use of vegan diets in the lower social-economic classes where supplementation is often zero and the descriptions (case reports) of diseases linked to deficiencies because they are isolated cases (less than 5).

Recent reviews in 2018 (11) and 2019 (5) reach the same conclusions. Vegan diets expose people to the consequences of nutritional deficiencies. This is why specific dietetic procedures and controls before, during and after pregnancy are essential in order to justify intakes (29).

*Primum non nocere*

The task of the Academy of Medicine is to take into account the health of the entire population concerned whatever its financial income, social-economic status or its ability to understand and manage supplementation for polyunsaturated fatty acids, choline, vitamins or trace elements daily while diversifying food types.

The purpose of the ARMB opinion is to inform the population about the necessity for careful dietetic supervision and about the risks run in the absence of monitoring. Its aim is not to attack or blame parents, even less to encourage legal proceedings.

A soothing talk about the matter omits the still rare observations noted in practice, and some of which are reported in the medical reviews. When it is known that the health status of children is linked to their parents' education, it seems to us to be our duty to undertake education without recommending thoughtless use of diets that are unsuitable for a fraction of the population.

Due to the routine supplementation of many foodstuffs in the USA, the US recommendations do not therefore seem to be transferable to the French-speaking Belgian population for whom this recommendation is intended.

Information, training and recommendations are indeed the watchwords in this opinion and not repression or stigmatisation as some people believe.

Table I: Average levels of various vitamins and trace elements depending on diet in the US and British populations (27, 28, 33,).

	US non-vegetarian	Non-vegetarian UK	Vegan US	UK vegan
Vitamin D (µg)	6.1	3.3	2.4	0.88
Retinol (mg)		654		76.6
Vitamin B12 (µg)	7.1	6.98	6.3	0.49
Vitamin B12 (pmol/l) *		281		122
Calcium (mg)	1072	989	933	582
DHA (mg)	102		0.0	
25(OH) Vitamin D (nmol/l)**		77		55.8

\* 52% of vegans, were classified as vitamin B12 deficient -Eur J Clin Nutr. 2010 ;64 (9):933-9 ;\*\*Public Health Nutr. 2011;14(2):340-6

**References**

1. Richter M, Boeing H, Grünewald-Funk D, Heseker H, Kroke A, Leschik-Bonnet E *et al.* For the German Nutrition Society. *Vegan diet. Ernährungs Umschau* 2016; **63**: 92–102.

2. Fewtrell M, Bronsky J, Campoy C, Domellöf M, Embleton N, Fidler Mis N *et al.* *Complementary feeding: a position paper by the European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Committee on Nutrition. J Pediatr Gastroenterol Nutr* 2017; **64**: 119–132.

*Although theoretically a vegan diet can meet nutrient requirements when mother and infant follow medical and dietary advice regarding supplementation, the risks of failing to follow advice are severe, including irreversible cognitive damage from vitamin B12 deficiency, and death. If a parent chooses to wean an infant onto a vegan diet this should be done under regular medical and expert dietetic supervision and mothers should receive and follow nutritional advice (115). Mothers who are consuming a vegan diet need to ensure an adequate nutrient supply, especially of vitamins B12, B2, A, and D, during pregnancy and lactation either from fortified foods or supplements. Careful attention is required to provide the infant with sufficient vitamin B12 (0.4 mg/day from birth, 0.5 mg/day from 6 months) and vitamin D, and iron, zinc, folate, n-3 fatty acids (especially DHA), protein, and calcium, and to ensure adequate energy density of the diet. « Vegan diets should only be used under appropriate medical or dietetic supervision and parents should understand the serious consequences of failing to follow advice regarding supplementation of the diet».*

3. Shaikh MG, Anderson JM, Hall SK, Jackson MA Transient neonatal hypothyroidism due to a maternal vegan diet. *J Pediatr Endocrinol Metab.* 2003; 16(1):111-3.

4. Piccoli GB, Clari R, Vigotti FN, Leone F, Attini R, Cabiddu G, Mauro G, Castelluccia N, Colombi N, Capizzi I, Pani A, Todros T, Avagnina P. Vegan-vegetarian diets in pregnancy: danger or panacea? A systematic narrative review. *BJOG.* 2015; 122(5):623-33.

5. Sebastiani G, Herranz Barbero A, Borrás-Novell C, Alsina Casanova M, Aldecoa-Bilbao V, Andreu-Fernández V, Pascual Tutusaus M, Ferrero Martínez S, Gómez Roig MD, García-Algar O. The Effects of Vegetarian and Vegan Diet during Pregnancy on the Health of Mothers and Offspring. *Nutrients.* 2019;11(3). Review

6. Koletzko B, Bauer CP, Bung P, Cremer M, Flothkötter M, Hellmers C, Kersting M, Krawinkel M, Przyrembel H, Rasenack R, Schäfer T, Vetter K, Wahn U, Weißenborn A, Wöckel A. Nutrition in pregnancy - Practice recommendations of the Network "Healthy Start - Young Family Network" *Dtsch Med Wochenschr.* 2012; 137(25-26):1366-72.

7. Pawlak R, Lester SE, Babatunde T The prevalence of cobalamin deficiency among vegetarians assessed by serum vitamin B12: a review of literature *Eur J Clin Nutr.* 2014; 68 (5):541-8.

8. Pawlak R<sup>1</sup>, Parrott SJ, Raj S, Cullum-Dugan D, Lucus D. How prevalent is vitamin B (12) deficiency among vegetarians? *Nutr Rev.* 2013; 71(2):110-7.

9. Awidi M, Bawaneh H, Zureigat H, AlHusban M, Awidi A Contributing factors to iron deficiency anemia in women in Jordan: A single-center cross-sectional study. *PLoS One.* 2018; 13(11):e0205868.

10. Pepper MR, Black MM B12 in fetal development *Semin Cell Dev Biol.* 2011; 22(6):619-23.

11. Cofnas N Is vegetarianism healthy for children? *Crit Rev Food Sci Nutr.* 2018 23:1-9.

*. The present paper argues that the Academy of Nutrition and Dietetics ignores or gives short shrift to direct and indirect evidence that vegetarianism may be associated with serious risks for brain and body development in fetuses and children. Regular supplementation with iron, zinc, and B12 will not mitigate all of these risks. Consequently, we cannot say decisively that vegetarianism or veganism is safe for children.*

12. Wallace TC, Blusztajn JK, Caudill MA, Klatt KC, Natker E, Zeisel SH, Zelman KM Choline: The Underconsumed and Underappreciated Essential Nutrient. *Nutr Today.* 2018 ; 53(6) :240-253.

13. Kersting M, Kalhoff H, Melter M, Lücke T. Dtsch Med Wochenschr. Vegetarian Diets in Children? - An Assessment from Pediatrics and Nutrition Science 2018 Feb;143(4):279-286
  14. Roed C., Skovby F, Lund AM Severe vitamin B12 deficiency in infants breastfed by vegans. *Ugeskr Laeger.* 2009; 171(43):3099-101.
  15. Fjørland ES<sup>1</sup>, Lindberg MJ Severe macrocytic anaemia and secondary hyperparathyroidism in a vegan *Ugeskr Laeger.* 2015; 177(33): V02150167
  16. Villalpando S. *Discussion: effects of folate and vitamin B12 deficiencies during pregnancy on fetal, infant, and child development. Food Nutr Bull* 2008; **29** (Supplement), S112–S115.
  17. R Pawlak To vegan or not to vegan when pregnant, lactating or feeding young children *European Journal of Clinical Nutrition* 2017; 71, p 1259–1262
  18. Tonstad S, Nathan E, Oda K, Fraser G Vegan diets and hypothyroidism. *Nutrients.* 2013 20;5 (11): 4642-52
  19. Magida Farrell L, Kalburgi S, McGarry-Hansen M, Regier DS Case 5: Acute Vomiting and Hallucinations in a 5-year-old Vegan Girl. *Pediatr Rev.* 2017 38(6):287
  20. Pawlak, R.; Lester, S.E.; Babatunde, T. The prevalence of cobalamin deficiency among vegetarians assessed by serum vitamin B12: A review of literature. *Eur. J. Clin. Nutr.* 2014, 68, 541–548
  21. Rizzo G, Laganà AS, Rapisarda AM, La Ferrera GM, Buscema M, Rossetti P, Nigro A, Muscia V, Valenti G, Sapia F<sup>1</sup>, Sarpietro G, Zigarelli M, Vitale SG. Vitamin B12 among Vegetarians: Status, Assessment and Supplementation. *Nutrients.* 2016 Nov 29;8 (12). pii: E767
  22. 2015–2020 (Dietary Guidelines for Americans. 8th Edition. December 2015; <http://health.gov/dietaryguidelines/2015/guidelines/>,
  23. Melina V, Craig W, Levin S Position of the Academy of Nutrition and Dietetics: Vegetarian Diets *J Acad Nutr Diet.* 2016 Dec; 116(12):1970-1980
  24. <https://www.eatrightpro.org/~media/eatrightpro%20files/practice/position%20and%20practice%20papers/position%20papers/vegetarian-diet.ashx> <https://www.nhs.uk/live-well/eat-well/the-vegan-diet/>
  25. <https://www.nhs.uk/live-well/eat-well/the-vegan-diet/> “
  26. <https://www.nhs.uk/live-well/eat-well/vegetarian-and-vegan-diets-q-and-a/> )
  27. Rizzo NS, Jaceldo-Siegl K, Sabate J, Fraser GE. Nutrient profiles of vegetarian and nonvegetarian dietary patterns. *J Acad Nutr Diet.* 2013 Dec; 113(12):1610-9.
- The fortification of many foods may provide relatively high mean intakes of these nutrients that are sometimes marginal among strict vegetarian living in other geographic and cultural contexts. However, relatively low intakes of vitamin B12 and D, are of concern for a small proportion of Adventist strict vegetarians in the U.S., as can be seen in the very low intakes at the 5th percentile....Thus there appear to be dissimilarities of vegetarian dietary habits between countries, although reported differences may be partly attributable to differing dietary assessment methods or differences in the dietary tables used.*
28. Davey GK, Spencer EA, Appleby PN, Allen NE, Knox KH, Key TJ. EPIC-Oxford: lifestyle characteristics and nutrient intakes in a cohort of 33 883 meat-eaters and 31 546 non-meat-eaters in the UK. *Public Health Nutr.* 2003; 6:259–269. [PubMed: 12740075]
  29. Pistollato F, Sumalla Cano S, Elio I, et al. Plant-based and plant-rich diet patterns during gestation: Beneficial effects and possible shortcomings. *Adv Nutr.* 2015;6 ( 5):581-591

30. Damayanti D, Jaceldo-Siegl K, Beeson WL, Fraser G, Oda K, Haddad EH Foods and Supplements Associated with Vitamin B<sub>12</sub> Biomarkers among Vegetarian and Non-Vegetarian Participants of the Adventist Health Study-2 (AHS-2) Calibration Study. *Nutrients*. 2018 Jun 4;10(6).
31. Venkatramanan S, Armata IE, Strupp BJ, Finkelstein JL. Vitamin B-12 and cognition in children. *Adv Nutr*. 2016 15;7 (5):879-88.
32. Vanacore D, Messina G, Lama S, Bitti G, Ambrosio P, Tenore G, Messina A, Monda V, Zappavigna S, Boccellino M, Novellino E, Monda M, Stiuso P Effect of restriction vegan diet's on muscle mass, oxidative status, and myocytes differentiation: A pilot study. *J Cell Physiol*. 2018 ;233(12):9345-9353.
33. Gilsing AM<sup>1</sup>, Crowe FL, Lloyd-Wright Z, Sanders TA, Appleby PN, Allen NE, Key TJ. Serum concentrations of vitamin B12 and folate in British male omnivores, vegetarians and vegans: results from a cross-sectional analysis of the EPIC-Oxford cohort study *Eur J Clin Nutr*. 2010 ;64(9):933-9.
- 34 Crowe FL, Steur M, Allen NE, Appleby PN, Travis RC, Key TJ. Plasma concentrations of 25-hydroxyvitamin D in meat eaters, fish eaters, vegetarians and vegans: results from the EPIC-Oxford study. *Public Health Nutr*. 2011 ;14(2):340-6.
35. Mangels AR Bone nutrients for vegetarians. [Am J Clin Nutr](#). 2014;100 1:469S-75S.