Supplementary material

**Exploring trajectories in dietary adequacy of the B vitamins folate, riboflavin, vitamins B6 and B12,with advancing older age: a systematic review**

Nicola Gillies; David Cameron-Smith; Shikha Pundir; Clare R. Wall; Amber M Milan.

**Supplementary Table 1:** Search strategy as applied to Medline **2**

 **Supplementary Table 2**: Reference list of studies excluded from full text review **5**

 **Supplementary Table 3** Details of funding sources and potential conflict of interest of
included studies **6**

**References: 7**

**Supplemental Table 1:** Search strategy as applied to Medline

|  |
| --- |
| Ovid MEDLINE(R) Epub Ahead of Print, In Process & Other Non-Indexed Citations, Ovid MEDLINE (R) Daily, and Ovid MEDLINE (R) 1946-Present |
| **#** | **Search Statement** | **Results** |
| 1 | vitamin b complex/ or folic acid/ or riboflavin/ or vitamin b 12/ or vitamin b 6/ | 53160 |
| 2 | vitamin B complex.mp. | 8560 |
| 3 | (folic acid or folate\* or vitamin b9 or vitamin b 9 or folvite\*).mp. | 47327 |
| 4 | (riboflavin or vitamin b2 or vitamin b 2 or vitamin g).mp. | 12721 |
| 5 | (vitamin b6 or vitamin b 6 or pyridoxine).mp. | 14510 |
| 6 | (vitamin b12 or vitamin b 12 or cobalamin\* or cyanocobalamin\* or eritron\*).mp. | 30325 |
| 7 | micronutrient\*.mp. | 14353 |
| 8 | or/1-7 | 104313 |
| 9 | Energy Intake/ | 37738 |
| 10 | ((energy or vitamin) adj intake\*).mp. | 48407 |
| 11 | (diet\* adj (intake\* or status)).mp. | 25199 |
| 12 | Nutritional Status/ | 38720 |
| 13 | ((nutrient or nutrition\*) adj (intake\* or status or assess\*)).mp. | 73621 |
| 14 | Nutrition Assessment/ | 13274 |
| 15 | (diet\* adj (adequacy or adequate or inadequacy or inadequate or deficien\* or sufficien\*)).mp. | 2789 |
| 16 | (nutrition\* adj (adequacy or adequate or inadequacy or inadequate or deficien\* or sufficien\*)).mp. | 5994 |
| 17 | (nutrient\* adj (adequacy or adequate or inadequacy or inadequate or deficien\* or sufficien\*)).mp. | 2176 |
| 18 | or/9-17 | 137750 |
| 19 | AGED/ or "AGED, 80 AND OVER"/ | 2826085 |
| 20 | (elderly or geriatric\*).mp. | 294260 |
| 21 | AGING/ | 215327 |
| 22 | (aging or ageing).mp. | 337560 |
| 23 | ((aged or ages or over) adj2 ("65" or sixty five or "80" or eighty)).mp. | 839043 |
| 24 | older.ti. | 76512 |
| 25 | advanced age\*.ti,ab. | 14769 |
| 26 | or/19-25 | 3156164 |
| 27 | cohort studies/ or follow-up studies/ or longitudinal studies/ or prospective studies/ | 1237147 |
| 28 | observational study/ | 49518 |
| 29 | (cohort or longitudinal or observation\*).mp. | 1474309 |
| 30 | (followup or follow-up or prospective).tw. | 1248042 |
| 31 | or/27-30 | 2820523 |
| 32 | 8 and 18 and 26 and 31 | 730 |
| 33 | limit 32 to yr="1990 -Current" | 701 |

**Supplemental Table 2.** Reference list of studies excluded from full text review

|  |  |
| --- | --- |
| Author, date | Reason for exclusion |
| Age of participants at follow-up | Full text not available | Full text not available in English | Nutrient intake not reported at follow-up | Nutrients of interest not reported | Presentation of nutrient intake data |
| Amorim Cruz *et al*, 1996(1) |  | ✓ |  |  |  |  |
| Bailey *et al*, 1997(2) |  |  |  |  | ✓ |  |
| Beydoun *et al*, 2018(3) |  |  |  |  | ✓ |  |
| Decarli *et al*, 1998(4) |  | ✓ |  |  |  |  |
| del Pozo *et al*, 2003(5) |  |  | ✓ |  |  |  |
| Fidanza *et al*, 1991(6) |  | ✓ |  |  |  |  |
| Flynn *et al*, 1992(7) |  |  |  |  | ✓ |  |
| Forman *et al,* 2005(8) | ✓ |  |  |  |  | ✓ |
| Fung *et al*, 2003(9) |  |  |  |  |  | ✓ |
| Gose *et al*, 2016(10) | ✓ |  |  |  |  |  |
| Hughes *et al,* 2017(11) |  |  |  | ✓ |  |  |
| Jacques *et al*, 2005(12) |  |  |  |  |  | ✓ |
| Kang *et al*, 2014(13) |  |  |  |  |  | ✓ |
| La Rue *et al*, 1997(14) |  |  |  |  |  | ✓ |
| Larsson *et al*, 2005(15) |  |  |  |  |  | ✓ |
| Lee *et al*, 2011(16) |  |  |  |  |  | ✓ |
| Michaud *et al*, 2000(17) |  |  |  |  |  | ✓ |
| Mori *et al*, 2008(18) |  | ✓ |  |  |  |  |
| Nicolas *et al*, 2000(19) |  | ✓ |  |  |  |  |
| Skarupski *et al*, 2010(20) |  |  |  |  |  | ✓ |
| Taylor *et al*, 2002(21) |  |  |  |  |  | ✓ |
| Voorripes *et al*, 2000(22) |  |  |  | ✓ |  |  |
| Winkvist *et al*, 2017(23) |  |  |  |  | ✓ |  |
| Yoo *et al*, 2009(24) |  | ✓ |  |  |  |  |
| Yoon *et al*, 2016(25) |  |  |  |  |  | ✓ |
| Zhang *et al*, 2002(26) | ✓ |  |  |  |  |  |

**Supplemental Table 3.** Details of funding sources and potential conflict of interest of included studies

|  |  |  |
| --- | --- | --- |
| **Author, year and country of publication** | **Funding Source** | **Conflict of interest** |
| Chapman *et al.* (1996) USA(27) | Not available | Not available |
| Fernyhough *et al*. (1999) New Zealand(28)  | 1. Health Research Council of New Zealand. 2. University of Otago Medical School | Not available |
| Flood *et al.* (2010) Australia(29)  | 1. Australian National Health & Medical Research Council2. Meat and Livestock Australia | No conflict of interest to declare |
| Kromhout *et al.* (1990) The Netherlands(30) | 1. Prevention Foundation2. Netherlands Nutrition Council | Not available |
| Sjogren *et al*. (1994) Sweden(31) | Not available | Not available |
| Toffanello *et al*. (2011) Italy(32)  | Not supported by any grants | No conflict of interest to declare |
| Yukawa *et al*. (2003) Japan(33) | Not available | Not available |
| Zhu *et al.* (2010) Australia(34) | 1. Healthway Health Promotion Foundation of Western Australia2. Australian Menopause Society3. Australian National Health And Medical Research Council | Not available |

**References**

1. Amorim Cruz JA, Moreiras O, Brzozowska A (1996). Longitudinal changes in the intake of vitamins and minerals of elderly Europeans. *Eur J Clin Nutr* **50**, S77-85.

2. Bailey AL, Maisey S, Southon S, et al. (1997). Relationships between micronutrient intake and biochemical indicators of nutrient adequacy in a “free-living” elderly UK population. *Br J Nutr* **77**, 225–42.

3. Beydoun MA, Fanelli-Kuczmarski MT, Poti J, et al. (2018). Longitudinal change in the diet’s monetary value is associated with its change in quality and micronutrient adequacy among urban adults. *PLoS One* **13**, e204141.

4. Decarli B, Dirren H (1998). The Swiss SENECA study: Nutritional status of Yverdon population aged 74 to 79 years and its follow-up over a period of 4 years. *Rev Med Suisse Romande* **118**, 701–7.

5. Del Pozo S, Cuadrado C, Moreiras O (2003). Are-related changes in the dietary intake of elderly individuals. Euronut-SENECA study. *Nutr Hosp* **18**, 348–52.

6. Fidanza F, Coli R, Fiorucci G, et al. (1991). Nutritional status of the elderly V). Dietary and biochemical data and anthropometry of noninstitutionalized elderly in Perugia at the eleventh year follow-up. *Int J Vitam Nutr Res* **61**, 346–55.

7. Flynn MA, Nolph GB, Baker AS, et al. (1992). Aging in humans: A continuous 20-year study of physiologic and dietary parameters. *J Am Coll Nutr* **11**, 660–72.

8. Forman JP, Rimm EB, Stampfer MJ, et al. (2005). Folate intake and the risk of incident hypertension among US women. *J Am Med Assoc* **293**, 320–9.

9. Fung TT, Spiegelman D, Egan KM, et al. (2003). Vitamin and carotenoid intake and risk of squamous cell carcinoma of the skin. *Int J Cancer* **103**, 110–5.

10. Gose M, Krems C, Heuer T, et al. (2016). Trends in food consumption and nutrient intake in Germany between 2006 and 2012: Results of the German National Nutrition Monitoring (NEMONIT). *Br J Nutr* **115**, 1498–507.

11. Hughes C, Ward M, Tracey F, et al. (2017). B-Vitamin Intake and Biomarker Status in Relation to Cognitive Decline in Healthy Older Adults in a 4-Year Follow-Up Study. *Nutrients* **9**, 53.

12. Jacques PF, Taylor A, Moeller S, et al. (2005). Long-term nutrient intake and 5-year change in nuclear lens opacities. *Arch Ophthalmol* **123**, 517–26.

13. Kang JH, Loomis SJ, Wiggs JL, et al. (2014). A prospective study of folate, vitamin B6, and vitamin B12 intake in relation to exfoliation glaucoma or suspected exfoliation glaucoma. *JAMA Ophthalmol* **132**, 549–59.

14. La Rue A, Koehler KM, Wayne SJ, et al. (1997). Nutritional status and cognitive functioning in a normally aging sample: A 6-y reassessment. *Am J Clin Nutr* **65**, 20–9.

15. Larsson SC, Giovannucci E, Wolk A (2005). Vitamin B6 intake, alcohol consumption, and colorectal cancer: A longitudinal population-based cohort of women. *Gastroenterology* **128**, 1830–7.

16. Lee JE, Willett WC, Fuchs CS, et al. (2011). Folate intake and risk of colorectal cancer and adenoma: modification by time. *Am J Clin Nutr* **93**, 817–25.

17. Michaud DS, Spiegelman D, Clinton SK, et al. (2000). Prospective study of dietary supplements, macronutrients, micronutrients, and risk of bladder cancer in US men. *Am J Epidemiol* **152**, 1145–53.

18. Mori K, Mekada Y, Wada S, et al. (2008). Actual conditions of change of nutritional status by aging in elderly community residents. *J Agric Sci Tokyo Nogyo Daigaku* **52**, 161–6.

19. Nicolas AS, Faisant C, Lanzmann-Petithory D, et al. (2000). The nutritional intake of a free-living healthy french population: A four-year follow-up. *J Nutr Health Aging*.

20. Skarupski K, Tangney C, Li H, et al. (2010). Longitudinal association of vitamin B-6, folate, and vitamin B-12 with depressive symptoms among older adults over time. *Am J Clin Nutr* **92**, 330–5.

21. Taylor A, Jacques PF, Chylack LT, et al. (2002). Long-term intake of vitamins and carotenoids and odds of early age-related cortical and posterior subcapsular lens opacities. *Am J Clin Nutr* **75**, 540–9.

22. Voorrips LE, Goldbohm RA, Brants HAM, et al. (2000). A prospective cohort study on antioxidant and folate intake and male lung cancer risk. *Cancer Epidemiol Biomarkers Prev* **9**, 357–65.

23. Winkvist A, Klingberg S, Nilsson LM, et al. (2017). Longitudinal 10-year changes in dietary intake and associations with cardio-metabolic risk factors in the Northern Sweden Health and Disease Study. *Nutr J* **16**, 1–12.

24. Yoo JA, Bae KY, Kim JM, et al. (2009). One-carbon metabolism and cognitive decline in an older Korean population. *Eur Neuropsychopharmacol*.

25. Yoon YS, Jung S, Zhang X, et al. (2016). Vitamin B2 intake and colorectal cancer risk; Results from the Nurses’ Health Study and the Health Professionals Follow-Up Study cohort. *Int J Cancer* **139**, 996–1008.

26. Zhang H, Hsu-Hage B, Wahlqvist M (2002). Longitudinal changes in nutrient intakes in the Melbourne Chinese Cohort Study. *Public Health Nutr* **5**, 433–9.

27. Chapman-Novakofski K, Ham J., Pearlman R. (1996). Longitudinal assessment of the nutritional status of elderly veterans. *J Gerontol A Biol Sci Med Sci* **51**, B261–9.

28. Fernyhough LK, Horwath CC, Campbell a J, et al. (1999). Changes in dietary intake during a 6-year follow-up of an older population. *Eur J Clin Nutr* **53**, 216–25.

29. Flood VM, Burlutsky G, Webb KL, et al. (2010). Food and nutrient consumption trends in older Australians: a 10-year cohort study. *Eur J Clin Nutr* **64**, 603–13.

30. Kromhout D, Coulander DL, Obermann-de Boer GL, et al. (1990). Changes in food and nutrient intake in middle-aged men from 1960 to 1985 (the Zutphen Study). *Am J Clin Nutr* **51**, 123–9.

31. Sjögren A, Österberg T, Steen B (1994). Intake of energy, nutrients and food items in a ten-year cohort comparison and in a six-year longitudinal perspective: A population study of 70- and 76-year-old swedish people. *Age Ageing* **23**, 108–12.

32. Toffanello ED, Inelmen EM, Minicuci N, et al. (2011). Ten-year trends in vitamin intake in free-living healthy elderly people: The risk of subclinical malnutrition. *J Nutr Health Aging* **15**, 99–103.

33. Yukawa H, Suzuki T (2003). Aging-related changes of food intake in elderly subjects living in an urban community and relation with vital prognosis: Results of an 8-year longitudinal study (TMIG-LISA). *Geriatr Gerontol Int* **3**, S55–62.

34. Zhu K, Devine A, Suleska A, et al. (2010). Adequacy and change in nutrient and food intakes with aging in a seven-year cohort study in elderly women. *J Nutr Health Aging* **14**, 723–9.