Vitamin D-fortified foods improve wintertime vitamin D status in women of Danish and Pakistani origin living in Denmark: a randomized controlled trial

**Purpose:** Low vitamin D status is prevalent worldwide. We aim to investigate the effect of vitamin D fortification on serum 25-hydroxyvitamin D (25(OH)D) concentration in women of Danish and Pakistani origin at risk of vitamin D deficiency.

**Methods:** A 12-week randomized, double-blinded, placebo-controlled intervention trial during winter time, designed to provide 20 µg vitamin D₃/day through fortified yoghurt, cheese, eggs and crisp bread, and assess the change in serum 25(OH)D. Participants were 143 women of Danish and Pakistani origin, living in Denmark, randomized into four groups, stratified by ethnicity. Results: Mean (SD) baseline 25(OH)D concentrations among women of Danish and Pakistani origin were 49.6 (18) and 46.9 (22) nmol/L, respectively (P = 0.4). While 9% of Danish women had 25(OH)D < 30 nmol/L, the prevalence among women of Pakistani origin was 24%. Median (IQR) vitamin D intake among Danish and Pakistani women at endpoint was 32.0 (27.0, 34.4) µg/day and 24.2 (19.2, 30.8) µg/day, respectively. Endpoint serum 25(OH)D increased in fortified groups to 77.8 (14) nmol/L among Danish women and 54.7 (18) nmol/L among women of Pakistani origin (P < 0.01). At endpoint, 0% in the Danish-fortified group and 3% in the Pakistani-fortified group had 25(OH)D < 30 nmol/L, compared with 23 % and 34% in their respective control groups. Conclusions: Vitamin D fortification of four different foods for 12 weeks during winter was effective in increasing serum 25(OH)D and reducing the prevalence of very low vitamin D status among women of Danish and Pakistani origin. ClinicalTrials.gov with identifier: NCT02631629.

**General information**
Publication status: Accepted/In press
Organisations: National Food Institute, Research group for Risk Benefit, Research group for Nutrition and Health Promotion, Department of Applied Mathematics and Computer Science , Research group for Bioactives – Analysis and Application, University of Copenhagen, University College Cork
Corresponding author: Grønborg, I. M., Tetens, I., Christensen, T., Andersen, E. W., Jakobsen, J., Kiely, M., Cashman, K. D., Andersen, R.
Publication date: 2019
Peer-reviewed: Yes

**Publication information**
Journal: European Journal of Nutrition
ISSN (Print): 1436-6207
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
Original language: English
Keywords: Vitamin D, Food-based RCT, ODIN, Women of Parkistani origin, Women of Danish origin, Fortified foods
DOI: 10.1007/s00394-019-01941-6
Source: FindIt
Source ID: 2444430187
Research output: Contribution to journal › Journal article – Annual report year: 2019 › Research › peer-review