



Associations between maternal-child dietary vitamin D and calcium intakes in UK male and female adolescents aged 14–18 years

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Significant relationships between parent-child dietary intakes have been reported previously, with mother-child (M-C) correlations stronger than father-child correlations⁽¹⁾. Additionally, mother-daughter (M-D) correlations may be stronger than for mother-son (M-S) pairs⁽¹⁾. There is little data relating to maternal influence on dietary vitamin D and calcium intakes in male or female adolescents, a crucial phase of rapid bone accrual and development of peak bone mass⁽²⁾.

The aim of this analysis was to examine associations between vitamin D and calcium intakes of mothers and adolescents (14–18 years) and specifically between M-D and M-S pairs recruited onto a 20 week vitamin D randomised controlled trial as part of the EU funded ODIN Project (*Food-based solutions for Optimal vitamin D Nutrition and health through the life cycle*). A total of 55 M-C pairs completed a Food Frequency Questionnaire at baseline to assess habitual vitamin D and calcium intakes from food sources only.

A significant, positive correlation was found between M-C vitamin D intakes ($r = 0.36$, $p = 0.007$) and M-C calcium intakes ($r = 0.32$, $p = 0.016$). When M-D ($n = 32$) and M-S ($n = 23$) pairs were investigated separately, a stronger and more significant positive correlation was identified for M-S versus M-D pairs for intakes of vitamin D ($r = 0.41$, $p = 0.05$ and $r = 0.33$, $p = 0.063$ respectively). However, for calcium intakes, correlations were not significant nor different between M-D and M-S pairs. Dietary vitamin D and calcium intakes for mothers and adolescents were divided into tertiles of intakes and chi-square test performed. Chi-squared test indicated significant associations between tertiles of vitamin D intakes in M-C and M-S pairings ($\chi^2 = 12.52$, $p = 0.014$ and $\chi^2 = 9.89$, $p = 0.042$ respectively) but not for M-D tertiles of intake. However, no significant associations were found for M-C, M-S or M-D tertiles of calcium intakes ($\chi^2 = 7.52$, $p = 0.111$; $\chi^2 = 4.60$, $p = 0.331$; $\chi^2 = 6.92$, $p = 0.140$ respectively).

Therefore, contrary to previous studies citing stronger relationships between intakes of gender matched parent-child pairs⁽¹⁾, the present analysis suggests that mothers may influence different types of food choices in their adolescent sons compared to their adolescent daughters, with a subsequent differential impact on vitamin D and calcium intakes. Stronger associations for dairy intakes between mothers and their adolescent daughters compared to adolescent sons have previously been reported⁽³⁾. This maternal influence may be important in the adolescent age group as 16% of UK females and 11% of UK males 11–18 years have calcium intakes below the Reference Nutrient Intake (RNI)⁽⁴⁾. There is currently no UK RNI for vitamin D, although dietary intakes are low amongst both adolescents and adults at between 2 and 4 $\mu\text{g}/\text{day}$ ⁽⁴⁾. Sub-optimal calcium intakes during adolescence, alongside inadequate vitamin D intakes and status, has the potential to prevent maximum peak bone mass being achieved which could consequently lead to an increased risk of fracture and osteoporosis in later life⁽²⁾. Further analysis will investigate the potential behaviours underlying these relationships and how any positive associations may be manipulated to improve adolescent dietary patterns and nutrient status, particularly with regard to key but often inadequate nutrients such as vitamin D and calcium.

1. Wang *et al.* (2011) *J Epidemiol Community Health*, **65**, 177–189.
2. Henry *et al.* (2004) *Osteoporos Int*, **15**, 263–273.
3. Hanson *et al.* (2005) *Public Health Nutr*, **8**, 77–85.
4. Bates *et al.* (2014) *Public Health England*.