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Corrigendum

Vitamin D deficiency and sufficiency among Canadian children residing at high latitude following the revision of the RDA of vitamin D intake in 2010 – CORRIGENDUM

Lalani L. Munasinghe, Yan Yuan, Noreen D. Willows, Erin L. Faught, John P. Ekwaru and Paul J. Veugelers

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Original text:

Abstract

Recently, countries at high latitudes have updated their vitamin D recommendations to ensure adequate intake for the musculoskeletal health of their respective populations. In 2010, the dietary guidelines for vitamin D for Canadians and Americans aged 1–70 years increased from 5 μg/d to 15 μg/d, whereas in 2016 for citizens of the UK aged ≥4 years 10 μg/d is recommended. The vitamin D status of Canadian children following the revised dietary guidelines is unknown. Therefore, this study aimed to assess the prevalence and determinants of vitamin D deficiency and sufficiency among Canadian children. For this study, we assumed serum 25-hydroxy vitamin D (25(OH)D) concentrations <30 nmol/l as 'deficient' and ≥50nmol/l as 'sufficient'. Data from children aged 3–18 years (n 2270) who participated in the 2012/2013 Canadian Health Measures Survey were analysed. Of all children, 5·6 % were vitamin D deficient and 71 % were vitamin D sufficient. Children who consumed vitamin D-fortified milk daily (77 %) were more likely to be sufficient than those who consumed it less frequently (OR 2·7; 95 % CI 1·4, 5·0). The 9 % of children who reported taking vitamin D-containing supplements in the previous month had higher 25(OH)D concentrations (OR 6·9 nmol/l; 95 % CI 1·1, 12·7 nmol/l) relative to those who did not. Children who were older, obese, of non-white ethnicity and from low-income households were less likely to be vitamin D sufficient. To improve vitamin D status, consumption of vitamin D-rich foods should be promoted, and fortification of more food items or formal recommendations for vitamin D supplementation should be considered.

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Original text:

Results (first and second para)

The mean serum 25(OH)D concentration of Canadian children in 2012/2013 was 62·2 nmol/l (95 % CI 55·8, 68·7; bootstrap SE 3·0) and the median was 62·0 nmol/l (interquartile range 47·6–74·5). The percentage of children with serum vitamin D concentrations

>30 nmol/l was 5·6 % (Table 1). The percentage of children with sufficient serum vitamin D concentrations based on the 50 nmol/l cut-off was 70·9 % and based on the 75 nmol/l cut-off 23·5 % (Table 1). The mean serum 25(OH)D concentrations of children aged 3–7, 8–12 and 13–18 years were 66·9 nmol/l (95 % CI 60·2, 73·6; bootstrap SE 3·2), 63·1 nmol/l (95 % CI 56·2, 70·1; bootstrap SE 3·3) and 58·3 nmol/l (95 % CI 52·0, 64·7; bootstrap SE 3·0), respectively. Only 9·2 % of children reportedly took vitamin D supplements and/or analogues (Table 2). The most commonly consumed vitamin D-rich food was milk, with 77·2 % reporting drinking milk once a day or more frequently (Table 2). The prevalence of at least weekly consumption of milk, red meat, eggs, margarine, fish and liver was 93·0, 86·5, 72·6, 47·4, 14·4 and 1·1 %, respectively (Table 2).

Table 3 depicts the associations of socio-demographic factors, anthropometric factors, season and vitamin D-containing supplements and/or analogue use with the likelihood of meeting vitamin D deficiency and sufficiency (multiple logistic regression model) and serum 25(OH)D concentrations (multiple linear regression model). Older children (13–18 years old) were less likely to have sufficient vitamin D concentrations (meeting 50 nmol/l: OR 0·3; 95 % CI 0·2, 0·5) compared with younger children (3–7 year old). Household income was positively associated with meeting the sufficiency threshold of 50 nmol/l serum 25(OH)D. Obese children compared with underweight/ normal-weight children combined were less likely to meet the sufficiency threshold (OR 0·4; 95 % CI 0·2, 0·8), as were children of non-white ethnicity compared with white ethnicity (OR 0·3; 95 % CI 0·2, 0·6). Age, non-white ethnicity and being overweight or obese were negatively associated with serum 25(OH)D concentrations, whereas household income was positively associated with it. Children were more likely to have higher serum 25(OH)D concentrations during summer and fall than in winter. The association of vitamin D-containing supplement and/or analogue use on achieving vitamin D sufficiency was not statistically significant, but it was positively associated with serum 25(OH)D concentrations (β 5·9 nmol/l; 95 % CI 1·3, 12·1 nmol/l). Comparable with the factors associated with meeting vitamin D sufficiency based on the cut-off of 50 nmol/l, household income, age, body weight status, season and ethnicity were associated with meeting the median vitamin D requirement of 40 nmol/l, and therefore the results are not shown in Table 3.

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The mean serum 25(OH)D concentration of Canadian children in 2012/2013 was 62·2 nmol/l (95 % CI 55·8, 68·7; bootstrap SE 3·0) and the median was 62·0 nmol/l (interquartile range 47·6–74·5). The percentage of children with serum vitamin D concentrations <30 nmol/l was 5·6 % (Table 1). The percentage of children with sufficient serum vitamin D concentrations based on the 50 nmol/l cut-off was 70·9 % and based on the 75 nmol/l cut-off 23·5 % (Table 1). The mean serum 25(OH)D concentrations of children aged 3–7, 8–12 and 13–18 years were 66·9 nmol/l (95 % CI 60·2, 73·6; bootstrap SE 3·2), 63·1 nmol/l (95 % CI 56·2, 70·1; bootstrap SE 3·3) and 58·3 nmol/l (95 % CI 52·0, 64·7; bootstrap SE 3·0), respectively. Only 9·2 % of children reportedly took vitamin D supplements and/or analogues (Table 2). The most commonly consumed vitamin D-rich food was milk, with 77·2 % reporting drinking milk once a day or more frequently (Table 2). The prevalence of at least weekly consumption of milk, red meat, eggs, margarine, fish and liver was 93·0, 86·5, 72·6, 47·4, 14·4 and 1·1 %, respectively (Table 2).

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Original text:

Discussion (4th para)

We identified that the use of vitamin D-containing supplements and/or analogues was positively associated with serum 25(OH)D concentration. However, the difference between children reportedly using v. not using supplements and/ or analogues was relatively small (6·9 nmol/l). Those who reported using supplements may not have been taking them regularly, and the amount of vitamin D present in the supplements and/or analogues may not have been enough to make a big difference. Unfortunately, we were unable to explore these reasons as the data on frequency of vitamin D-containing supplement and/or analogue use and the amount of vitamin D in the supplements and/or analogues were not available.

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