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Letter to the Editor

Food fortification as a means to increase vitamin D intake

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Soininen *et al.*[1] recently reported about vitamin D intake, serum 25-hydroxyvitamin D (25(OH)D) concentration, determinants of 25(OH)D and risk factors for serum 25(OH)D < 50 nmol/l in Finnish children. The authors draw conclusions that 80 % of the children did not meet the current recommendation for vitamin D intake from food and supplements and 20 % had serum 25(OH)D concentrations <50 nmol/l. This may cause concern about the adequacy of the vitamin D status at northern latitudes. The study and its results are potentially interesting, but the authors have misled the reader to some extent by not stressing that the data collection was carried out between the years 2007–2009. At the time of the study, a decree on general vitamin D fortification had been adopted in 2002[2]. It stated that the vitamin D levels for fluid milk products (with exception of organic products) and respective lactose-free milk and soya- and cereal-based drinks should be 0·5 μg/100 g and for spreadable fats 10 μg/100 g. These levels were, however, much lower than the present ones.

Studies and reports about the efficacy of that fortification level[2] on vitamin D intake and 25(OH)D concentrations in different population groups in Finland were already carried out in 2000s[3–7]. The main message of these studies was that, although the 25(OH)D concentrations and vitamin D intake mainly tended to increase because of the fortification, a significant percentage of the subjects remained with inadequate vitamin D status in all age groups. From that point of view, the study of Soininen *et al.*[1] does not provide any new data, as this has already been reported in children and adolescents as well[5,7,8]. The results of those earlier studies from the 2000s led to the discussion on new recommendations on fortification levels in 2010.

In April 2010, The National Nutrition Council launched a new recommendation that the fortification levels should be doubled to 1·0 μg/100 g for all fluid milks and respective products and to 20 μg/100 g for spreadable fats[9]. These recommendations were based on simulations on the effect of fortification. Especially the dairy industry responded immediately and almost all fluid milk products were fortified, with the exception of ecological products. Soininen *et al.*[1] discuss this, but they still seem to hide this fact from their conclusions. They do not point out that nowadays, since 2010, the range of vitamin D content in dairy products in Finland has increased because of the new fortification policy. In addition, a wide selection of vitamin D-fortified products, not only fluid milk and spreads, are currently on the market. Some fluid milk products contain even 2 μg vitamin D/100 g and, for example, a number of yogurts may have the same amount[10].

Thus, it is probable that this later fortification has had a positive impact on the vitamin D intake and status among Finnish children, especially among those who consume fluid milk products. This has been reported in adults, whose mean vitamin D intake now is about 10 μg, and close to 40–50 % of it comes from fortified milk products[11]. Moreover, the supplementation recommendations for children and adolescents have been increased and extended to cover the whole year since 2011[12]. Consequently, the conclusion of the authors that many children need more vitamin D from food or supplements to reach sufficient serum 25(OH)D concentrations in northern latitudes is drawn from outdated data, which is a serious flaw in the interpretation of it. These actions have already been taken in 2010, and what we need is new data from the time after that. The Physical Activity and Nutrition in Children (PANIC) study is an ongoing trial, and the second 2-year follow-up was carried out in 2009–2011. Thus, we wonder why the authors have not presented new data after the year 2010 fortification, because they seem to have it already[13].

Further, the results of the Soininen *et al.*[1] study have a significant and serious methodological problem, which subsequently weakens the conclusions regarding vitamin D status. The analytical assay used for 25(OH)D, the LIAISON® 25OHD Total assay (DiaSorin Inc.), has been shown to have a negative bias in external analyses, for example, DEQAS (Vitamin D External Quality Assessment Scheme, deqas.kpmd.co.uk)[14]. Thus, the 25(OH)D data are flawed and make subsequent analyses worthless. This is a common problem with 25(OH)D, which causes bias in the result assays[15]. This is extremely important to understand when vitamin D status cut-off values are reported and used. During the last few years, the Vitamin D Standardization Programme (VDSP) has been initiated by National Institute of Health, with the aim to standardise commercial assays against two reference laboratories using National Institute of Standards and Technology reference material[16]. An important focus of the VDSP is on standardising the measurement of 25(OH)D in national health and nutrition surveys around the world by recalibrating 25(OH)D values from past surveys[17,18]. As the assay used is of such importance in reporting vitamin D status in populations, it is astonishing that the authors do not even mention any external quality control system.

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