

Abstract

Improvement in Vitamin D Status and Long-Term Incidence of Type 2 Diabetes in the General Finnish Population—Evidence Based on Cohort and Register Datasets [†]

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Abstract: Background and objectives: Large improvements in vitamin D status (serum 25-hydroxyvitamin D; S-25(OH)D) have been recorded among the general Finnish population, mainly due to vitamin D fortification policies and supplement use. Vitamin D intake has increased since the beginning of the fortification scheme in 2003 and subsequently by its increment in 2010. Also, vitamin D supplement use has increased over the years. However, whether sufficient vitamin D status lowers the risk of diabetes is unclear. Hence, we investigated the association between the improved vitamin D status in the Finnish adult population and long-term incidence of type 2 diabetes (T2D). Methods: This study evaluated data of Finnish adults aged ≥ 30 years ($n = 3014$) in a longitudinal setting (Health 2000/2011 cohort) who did not have T2D at baseline. The S-25(OH)D concentrations from both time points (years 2000 and 2011) were standardized according to the Vitamin D Standardization Program. The survey datasets were linked with incident T2D datasets from the national register for the time period 2000–2019. Associations between vitamin D status, change in S-25(OH)D concentrations and incidence of T2D over the 8-year follow-up period were assessed using logistic and Cox regression models (adjusted for age, sex and blood sampling season, etc.). Results: Over the 8-year follow-up period, 214 T2D incident cases were observed in subjects who participated in both Health 2000 and Health 2011. We observed a borderline significantly lower mean baseline S-25(OH)D concentration among T2D cases (45.4 [SD = 12.3] nmol/L) compared with participants not having T2D (48.1 [SD = 134.6] nmol/L) ($p = 0.01$). Having a sufficient vitamin D status (S-25(OH)D ≥ 50 nmol/L) at baseline was associated with lower odds of T2D (adjusted OR 0.94 [95% CI 0.89–0.98]). In participants whose S-25(OH)D concentrations increased over the years, the T2D incidence was lowered (adjusted HR 0.01 [95% CI 0.00–0.01] and 0.82 [95% CI 0.76–0.89] for $\Delta \geq 50$ nmol/L). Discussion: Our preliminary findings indicate a protective effect of increased 25(OH)D (up to 50 nmol/L) against T2D among Finnish adults with an initially low vitamin D status. This study shows that well-designed longitudinal cohorts using standardized methods carry valuable potential to evaluate national nutrition status and to investigate the relationship between nutrition status and chronic diseases.



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Data Availability Statement: Restrictions apply to the availability of these data. Data was obtained from the Finnish Institute for Health and Welfare with permission (<https://thl.fi/en/web/thlfi-en/research-and-development/research-and-projects/health-2000-2011>).

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