Prevalence of Elevated HbA1c among Multiple Dietary Supplement Users

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ABSTRACT (UPDATED)

 Approximately 25% of older Americans consume ≥4 dietary supplements/day. Block et al. reported an unusually low prevalence of diabetes in a cohort of long-term (≥20 y) users of multiple nutritional supplements. A decade later, we collected medical histories and measured HbA1c in members of the original sample plus an additional sample of the cohort who used multiple supplements for 3-5 years. Long-term multi-supplement users (LTMS, n=206, 22-89 y) were compared to NHANES 07-10 participants (20-80 y), characterized as non-supplement users (n=1409), multivitamin only users defined as ≤10 vitamins/minerals (n=888), users of only one single component supplement (e.g., fish oil) or one single purpose supplement with fewer than 10 vitamins and minerals (e.g., calcium and vitamin D) (n=300), or users of ≥2 supplement products (n=1170). As the Block study participants were essentially all non-Hispanic white (98.1%) and all non-smokers, we limited the LTMS sample to NHANES, non-smoking participants. However, even after this restriction, the LTMS sample showed demographic differences from the NHANS sample including an older age, a higher percentage of women, higher incomes, more college educated, and lower BMI. The sex & BMI adjusted prevalence of diabetes was lower among members of the LTMS cohort compared to the NHANS sample, with the sex & BMI adjusted difference among those aged ≥60 y (6.2% for LTMS cohort vs 9.2% for NHANS cohort, 95% CI: 7.6, 9.8, p=0.003). Prevalence of diabetes in other supplement user groups was not significantly different from that of the non-supplement users. Analyses to be completed will assess nutritional status and additional metabolic risk factors. A limitation of this study is potential for self-selection of healthier individuals into the LTMS group. However, given the importance of addressing the high incidence of type 2 diabetes and the relative safety of fortified food and supplement use, and the previous observation of improved cardiovascular health (1), further investigations in LTMS users are warranted.

BACKGROUND

A previous study of a cohort of 20+ y users of multiple dietary supplements found, in addition to better nutritional status vs. NHANES controls, improved risk factors and lower prevalence of disease, including diabetes (1). That study did not include diabetes-related clinical chemistry, or collect information on the use of diabetes medication. We report initial findings with respect to diabetes prevalence from a new study of this cohort, including both participants in the original study and a sample of 3-5 year multiple supplement users. There is evidence that improved nutritional status (e.g., calcium & D) (2), choice of a low glycemic index meal plan (3), or low levels of nutritionally modifiable markers of inflammation (4,5) can lower the risk of type 2 diabetes. In a previous study of the LTMS population, the sample showed improved nutritional status, lower risk factors including CRP, and the prevalence of diabetes was only 2.9% at an average age of 63 (1). We have now repeated this diabetes observation and further supported it with measurement of HbA1c and capture of diabetes medication use. Analyses yet to be completed include measures of nutritional status and risk factors. A limitation of this study is non-random nature of the subject selection. However, the importance of addressing the high incidence of type 2 diabetes and the relative safety of fortified food & supplement use, further investigations in this population are warranted.

METHODS

Long term multi-vitamin users (LTMS), 2+ supplements/week, were recruited from a dietary supplement manufacturer and distributor (Shaklee Corp.). Participants from the 2007-2010 NHANES were used for comparison to the LTMS sample. To match the characteristics of the LTMS sample, NHANES subjects were restricted to non-Hispanic white (NHW) adults, 20 + years of age, who did not currently smoke, were not pregnant and were free of cancer. A previous study of a cohort of 20+ year users of multiple dietary supplements (6) reported an unusually low prevalence of diabetes in a cohort of long-term users of multiple dietary supplements. We report initial findings with respect to diabetes prevalence from a new study of this cohort, including both participants in the original study and a sample of 3-5 year multiple supplement users. The Block study participants were essentially all non-Hispanic white (98.1%) and all non-smokers. However, even after this restriction, the LTMS sample showed demographic differences from the NHANS sample including an older age, a higher percentage of women, higher incomes, more college educated, and lower BMI. The sex & BMI adjusted prevalence of diabetes was lower among members of the LTMS cohort compared to the NHANS sample, with the sex & BMI adjusted difference among those aged ≥60 y (6.2% for LTMS cohort vs 9.2% for NHANS cohort, 95% CI: 7.6, 9.8, p=0.003). Prevalence of diabetes in other supplement user groups was not significantly different from that of the non-supplement users. Analyses to be completed will assess nutritional status and additional metabolic risk factors. A limitation of this study is potential for self-selection of healthier individuals into the LTMS group. However, given the importance of addressing the high incidence of type 2 diabetes and the relative safety of fortified food and supplement use, and the previous observation of improved cardiovascular health (1), further investigations in LTMS users are warranted.

RESULTS

Prevalence of diabetes based on a 2-hour oral glucose tolerance test: we separated subjects into 3 age groups (20-39, 40-59, 60+ years), and performed an ANCOVA adjusting for sex & BMI. Least squares means and 95% CIs by age group are presented below. We used the same methods to provide sex adjusted estimates for each age group by supplement group, graphed as line series. Compared with NHANES, the LTMS group exhibited progressively improved diabetes prevalence with age. Within the NHANES data, the use of two or more supplements also trended towards better outcomes with age (significant interaction with age, p<0.01).

DISCUSSION

REFERENCES


