

Obesity

AL02-01-24 Adaptive Dietary and Exercise Strategies for Adults With Prediabetes Trial (ADAPT): A Sequential Multiple Assignment Randomized Trial

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Objectives: Dietary carbohydrate restriction, time restricted eating (TRE), and exercise (Ex) are commonly used strategies for weight loss and improving glycemic control. However, the optimal combination and sequence of these strategies is unclear.

Methods: ADAPT was a 16-week group-based weight loss Sequential Multiple Assignment Randomized Trial (SMART). Ninety adults with BMI ≥ 27 kg/m² and prediabetes were initially randomized to either a reduced carbohydrate (RC) or high carbohydrate (HC) diet. Participants achieving $< 2.5\%$ weight loss at week 4 (non-responders) were re-randomized to augment their dietary prescriptions with either TRE or Ex counseling. Linear mixed models were used to compare 1st (RC vs. HC) and 2nd (TRE vs. Ex) stage interventions and the resulting 4 embedded adaptive interventions (EAI) were rank ordered for changes in weight, fasting glucose and glycated hemoglobin (A1c).

Results: Among the 82 participants (53.8 ± 11.7 years, 84.3% female, BMI 38.3 ± 7.2 kg/m²) who completed week 4, 55.4% (n=46) were re-randomized to TRE (n=22) or Ex (n=24). There was no difference in weight loss between HC and RC (-0.18 kg, 95%CI: $-2.21, -1.86$, $P=0.87$). Fasting glucose improved more with HC compared to RC (-13.10 mg/dL, 95%CI: $-19.90, -6.630$, $P=0.0002$), but changes in A1c were not different (-0.02% , 95%CI: $-0.15, 0.11$, $P=0.73$). Among non-responders, augmenting with TRE or Ex did not significantly affect changes in weight (-0.21 kg, 95%CI: $-2.32, 1.90$, $P=0.85$), fasting glucose (-8.39 mg/dL, 95%CI: $-17.9, 1.11$, $P=0.084$), or A1c (-0.13% , 95%CI: $-0.31, 0.04$, $P=0.14$). The EAI initiating with a HC diet and adding Ex counseling for non-responders produced the quantitatively largest reductions in weight (-4.77 kg, 95%CI: $-6.16, -3.39$), fasting glucose (-18.6 mg/dL, 95%CI: $-29.2, -8.0$), and A1c (-0.21% , 95%CI: $-0.35, -0.07$).

Conclusions: Initiating behavioral weight loss with a HC diet prescription was more effective for reducing fasting glucose in people with prediabetes compared to a RC diet despite similar weight loss. The lack of a meaningful impact of TRE or Ex counseling suggests that more intensive strategies (e.g., food provision and supervised exercise) may be needed for early non-responders to counseling-based dietary weight loss programs.

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AL02-02-24 Type 2 Diabetes and Cardiovascular Disease Burdens Attributable to Sugar-Sweetened Beverages Among Adults in 184 Countries

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Objectives: We aimed to quantify SSB-attributable T2D and CVD burdens among adults 20+ years across 184 countries in 1990 and 2018 globally, regionally, and nationally jointly stratified by age, sex, education level, and urban or rural residence.

Methods: A comparative risk assessment model was used to estimate global T2D and CVD burdens attributable to intake of SSBs. We leveraged independent data including population SSB intake from the Global Dietary Database; optimal SSB intake levels; direct and BMI-mediated age-adjusted etiologic effects of SSBs on T2D and CVD from previous meta-analyses and pooled analyses of prospective cohorts; BMI-stratified effects of SSBs on weight gain or loss; population overweight and underweight from the NCD Risk Factor Collaboration; and total T2D and CVD burdens from the Global Burden of Disease study.

Results: In 2018, 1.9 million (95% UI 1.8, 2.1) incident T2D cases and 877,858 (80,6455, 949,117) incident CVD cases were attributable to intake of SSBs worldwide. Latin America/Caribbean and Sub-Saharan Africa had the highest proportional SSB-attributable CVD and T2D incident cases. Globally, SSB-attributable T2D and CVD incident cases were higher among males vs. females and urban vs. rural adults globally. High vs. low-educated adults had higher SSB-attributable T2D incidence, but the effect of education on CVD incident cases was less evident. Proportional SSB-attributable T2D and CVD incident cases were higher among younger vs. older adults. From 1990 to 2018, the greatest absolute increases of proportional SSB-attributable incidence in Sub-Saharan Africa (T2D: 8.8% [6.6, 11.1]; CVD: 4.3% [3.1, 5.7]), while Latin America/Caribbean experienced slight decreases.

Conclusions: The largest T2D and CVD SSB-attributable burdens in 2018 were in Latin America/Caribbean and Sub-Saharan Africa, with variations by population subgroups. Sub-Saharan Africa experience the greatest increases from 1990 to 2018. By highlighting the regions, countries, and sub-populations most affected, our research can assist in shaping effective policies and interventions to ultimately reduce the burden of cardiometabolic diseases attributed to SSB consumption globally.

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