

# The Portfolio Diet and HbA1c in adults living with type 2 diabetes mellitus: a patient-level pooled analysis of two randomized dietary trials

**Meaghan E Kavanagh, Songhee Back, Victoria Chen, Andrea J Glenn, Gabrielle Viscardi, Zeinab Houshialsadat, John L Sievenpiper, Cyril WC Kendall, David JA Jenkins, and Laura Chiavaroli**

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## Supplement

**Table S1:** Portfolio Diet pillars with the clinical Portfolio Diet Score targets for a 2,000-kcal diet.

Portfolio Diet Pillars	Examples of Portfolio Diet foods for 1 c-PDS point
	<b>2,000 kcal</b>
<b>Nuts and seeds, amount/point</b>	Almonds - 7 nuts Walnuts - 4 halves Pistachio (shell-free) - 15 nuts Peanuts (shell-free) - 8 nuts Other nuts - 7 nuts Nut or seed butters, all natural - 2 tsp Ground flax seeds - 1 tbsp Seeds, e.g. pumpkin, sunflower, chia - 1 tbsp
<b>Plant protein, amount/point</b>	Soy/Pea beverage (fortified) - 1.25 cups Tofu (extra firm or firm) - 1/2 cup Tofu (silken, soft) - 2/3 cup Tempeh - 1/4 package (50g) Edamame (shelled) - 1/2 cup Chickpeas (cooked/canned) - 1/2 cup Beans (cooked/canned) - 1/2 cup Lentils (cooked/canned) - 1/2 cup Peas, green - 1 cup Veggie burger - 1 patty* Veggie sausage patties - 2 patties* Veggie meat grounds - 1/3 cup* Veggie Chick'n tenders - 3 tenders* Soy/pea protein powders** - 1.5 tbsp
<b>Viscous fibre, amount/point</b>	100% Psyllium husk powder - 1 tsp 100% Psyllium husk - 1 tbsp Psyllium powder product (e.g. Metamucil) - 2tsp PGX® supplement - 2g (2-3 capsules) Oat bran (dry) - 2/3 cup All-bran Buds with Psyllium - 1/2 cup Steel cut oats/oatmeal (dry) – 3/4 cup Oat bran bread - 1 slice Barley (cooked) - 2 cups Okra (cooked) - 3 cups

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	Eggplant (cooked) - 4 cups
	Persimmons - 2 large
	Oranges - 2 large
	Apples - 2 large
	Berries - 2 cups
<b>Plant sterols, amount/point</b>	Plant sterol margarine - 1 tsp
	Packet - 1/5th packet
	Plant sterol powder - 1/5 tsp
	Supplements - 1 capsule§
<b>High MUFA oils, amount/point</b>	Extra virgin Olive Oil - 2 tsp
	Cold press Canola Oil - 2 tsp
	Cold press Soy Bean Oil - 2 tsp
	High Oleic Oils - 2 tsp (E.g. High Oleic Sunflower, Safflower or Soy)
	Canola Oil - 2 tsp
	Soybean Oil - 2 tsp
	Avocado - 1/4 fruit

Abbreviations: c-PDS, clinical Portfolio Diet Score; MUFA, monounsaturated fatty acid.

\* For plant-based meats, they must come from soy or pulse-based proteins.

\*\*For protein powder, it must come from soy or pulse-based proteins.

§ For Supplements, typically 5 capsules = 2g plant sterols which is the total recommended amount per day.

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**Table S2:** Pooled raw values for cardiometabolic risk factors at baseline and end (6-months) for control (high fibre dietary advice) and test (low glycemic index dietary advice) groups

Outcomes	Baseline		End (6-months)		Change		P-value*
	Control	Test	Control	Test	Control	Test	
HbA1c, %	7.06 (0.04)	7.10 (0.05)	6.81 (0.06)	6.49 (0.06)	-0.25 (0.06)	-0.61 (0.05)	<0.0001
LDL-C, mmol/L	2.3 (0.07)	2.4 (0.08)	2.3 (0.07)	2.3 (0.08)	0.01 (0.04)	-0.06 (0.05)	0.31
Non-HDL-C, mmol/L	2.9 (0.07)	3.0 (0.08)	2.9 (0.07)	2.9 (0.08)	-0.01 (0.05)	-0.09 (0.06)	0.30
TC, mmol/L	4.1 (0.08)	4.1 (0.09)	4.1 (0.08)	4.0 (0.09)	-0.01 (0.05)	-0.06 (0.06)	0.45
TG, mmol/L	1.4 (0.08)	1.5 (0.08)	1.3 (0.06)	1.4 (0.11)	-0.07 (0.05)	-0.07 (0.09)	0.96
HDL-C, mmol/L	1.2 (0.02)	1.1 (0.03)	1.2 (0.02)	1.1 (0.02)	0.0001 (0.01)	0.02 (0.01)	0.22
SBP, mmHg	126.4 (1.20)	125.4 (1.15)	123.2 (1.20)	122.4 (0.98)	-3.17 (1.04)	-3.02 (1.06)	0.92
DBP, mmHg	72.0 (0.80)	72.4 (0.81)	70.3 (0.77)	70.6 (0.71)	-1.72 (0.68)	-1.79 (0.65)	0.94

Abbreviations: CI, confidence interval; c-PDS, clinical Portfolio Diet Score, DBP, diastolic blood pressure; HDL-C, high-density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; SBP, systolic blood pressure; TC, total cholesterol; TG, triglycerides.

Values are means (SE). Control n=132, test n=135

\*P value for difference in change across test and control group.

**Table S3:** Multilinear regression analysis of the associated change in clinical Portfolio Diet Score and cardiovascular risk factors.

Cardiovascular risk factor	Beta coefficient* (95% CI)	P-value
LDL-C, mmol/L	-0.03 (-0.05, -0.01)	0.016
Non-HDL-C, mmol/L	-0.04 (-0.06, -0.02)	0.001
TC, mmol/L	-0.04 (-0.06, -0.01)	0.002
TG, mmol/L	-0.04 (-0.07, -0.01)	0.017
HDL-C, mmol/L	0.002 (-0.003, 0.01)	0.40
SBP, mmHg	-0.01 (-0.48, 0.49)	0.98
DBP, mmHg	-0.05 (-0.37, 0.26)	0.72

Abbreviations: CI, confidence interval; c-PDS, clinical Portfolio Diet Score, DBP, diastolic blood pressure; HDL-C, high-density lipoprotein cholesterol; LDL-C, low density lipoprotein cholesterol; SBP, systolic blood pressure; TC, total cholesterol; TG, triglycerides.

\*Adjusted for age (continuous), sex (female, male), smoking (yes, no), body mass index (BMI) (continuous), trial (DMGI, DM-MRI), antihyperglycemic medications (yes, no), BP medications (yes, no), lipid lowering medications (yes, no), and prior cardiovascular event (yes, no).

P value for linear regression

To convert total cholesterol, HDL, non-HDL-C, and LDL-C from mmol/L to mg/dL multiply by 38.67.

To convert triglycerides from mmol/L to mg/dL multiply by 88.57.

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**Table S4:** Mediation analyses between the clinical Portfolio Diet Score and HbA1c.

Mediator		Beta coefficient**	95% CI	P-value
Dietary GI	Model 2*	-0.04	(-0.07, -0.02)	0.001
	Model 2* + dietary GI	-0.02	(-0.05, 0.01)	0.287
Body weight change	Model 2*	-0.04	(-0.07, -0.02)	0.001
	Model 2* + BW	-0.03	(-0.05, 0.01)	0.005

Abbreviations: BW, body weight; CI, confidence interval; GI, glycemic index.

\*Model 2 adjusted for age (continuous), sex (female, male), smoking (yes, no), body mass index (BMI) (continuous), trial (DMGI, DM-MRI), antihyperglycemic medications (yes, no), blood pressure medications (yes, no), lipid lowering medications (yes, no), and prior cardiovascular event (yes, no).

\*\*Change per 1 point

P value for linear regression

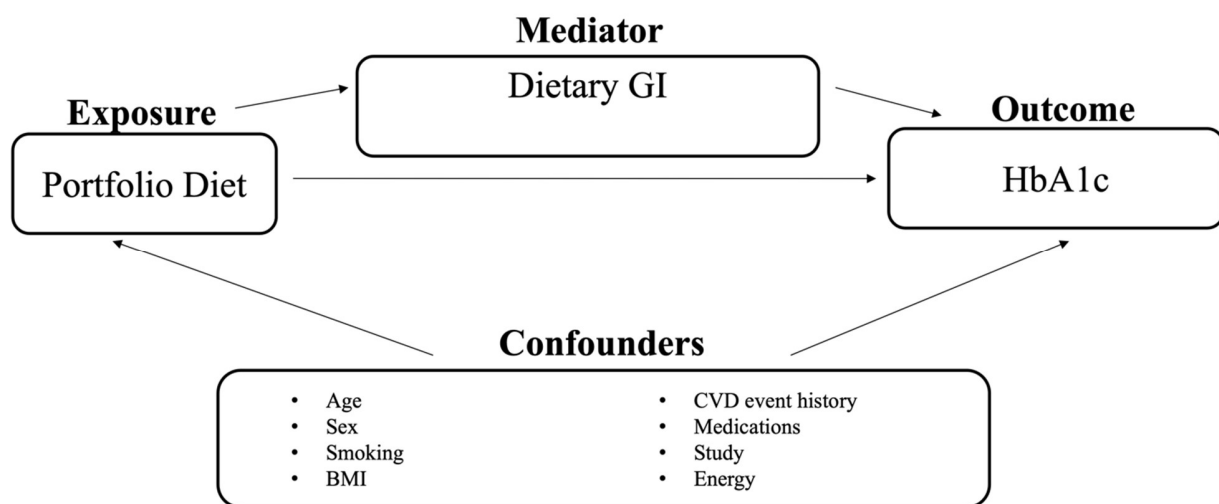
**Table S5:** Stratified analysis of the association of change in clinical Portfolio Diet Score and change in HbA1c by sex and ethnicity.

HbA1c (%)	N	Beta-coefficient per 1 point increase in c-PDS (95% CI)	P <sub>interaction</sub>
Sex			0.553
Female	98	-0.05 (-0.09, -0.02)	
Male	169	-0.04 (-0.07, -0.001)	
Ethnicity			0.782
White	180	-0.03 (-0.65, -0.01)	
South Asian	43	-0.02 (-0.08, 0.04)	
East Asian	17	-0.05 (-0.15, 0.05)	
Other*	26	-0.04 (-0.14, 0.07)	

Abbreviations: CI, confidence intervals; c-PDS, clinical Portfolio Diet Score. HbA1c, glycated hemoglobin.

Adjusted for age (continuous), smoking (yes, no), body mass index (BMI) (continuous), trial (DMGI, DM-MRI), antihyperglycemic medications (yes, no), blood pressure medications (yes, no), lipid lowering medications (yes, no), and prior cardiovascular event (yes, no).

\*Other includes Black, Native, Hispanic and those who selected “other” ethnicity. Consolidated owing to small numbers.



**Figure S1:** Conceptual model for the Portfolio Diet and HbA1c in adults living with T2DM.

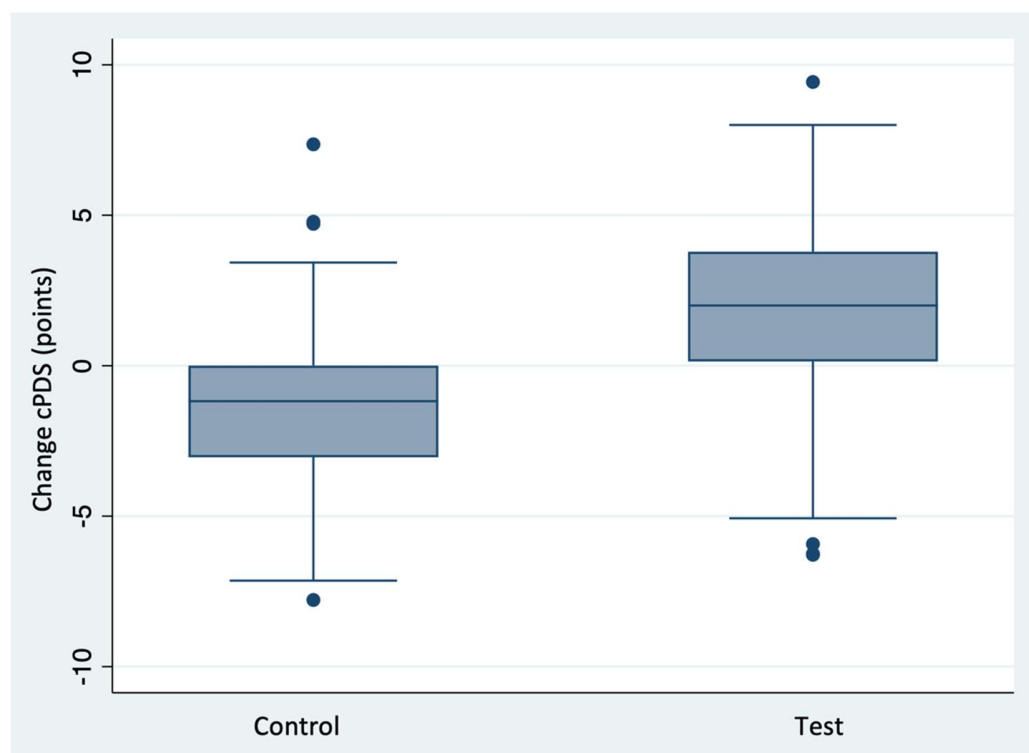
Abbreviations: BMI, body mass index; c-PDS, clinical Portfolio Diet Score; CVD, cardiovascular disease; GI, glycemic index; HbA1c, glycated hemoglobin.

Adjustments included age (continuous), sex (female, male), smoking (yes, no), body mass index (BMI) (continuous), trial (DMGI, DM-MRI), antihyperglycemic medications (yes, no), blood pressure medications (yes, no), lipid lowering medications (yes, no), and prior cardiovascular event (yes, no) as covariates.

Given the c-PDS is adjusted for energy, a separate adjustment for energy was not performed, as this would be an overadjustment.

Dietary GI was predicted to be a mediator for the Portfolio Diet and HbA1c.

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**Figure S2:** Change in the clinical Portfolio Diet Score shown by the control (high fibre dietary advice) and test (low glycemic index dietary advice) groups.

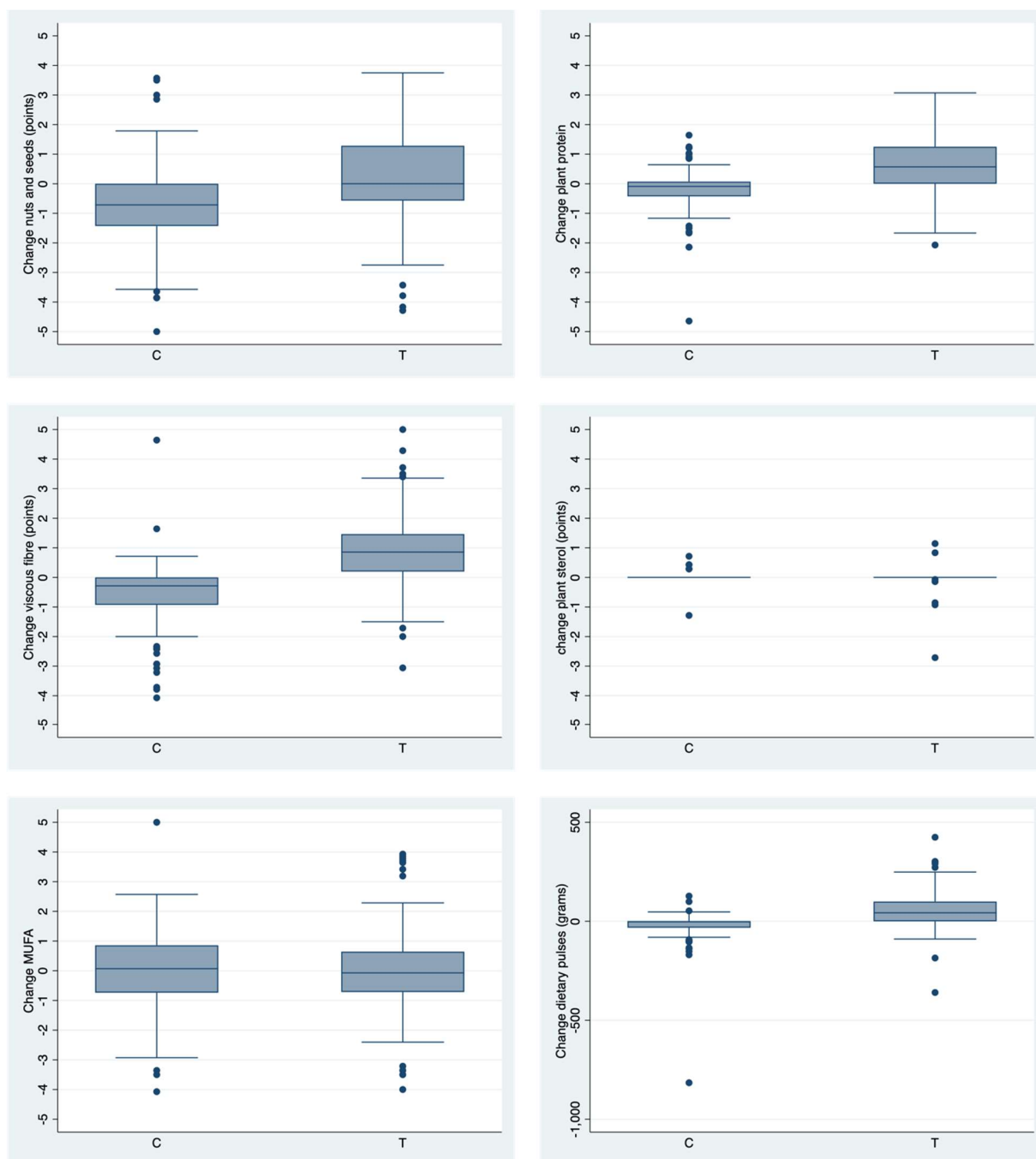
Abbreviations: c-PDS, clinical Portfolio Diet Score.

The center line in each box represents the 50th percentile (median change). The bottom of each box represents the 25th percentile of c-PDS and the top of each box represents the 75th percentile of c-PDS. The whiskers represent the upper and lower extremes with dots showing outliers.

The 6-month c-PDS for those in the control groups was 2.6 points (10%), ranging from 0 to 13 points (0% to 52%) and for those in the test groups was 5.8 points (23%), ranging from 0.5 to 18.3 points (2% to 74%).

The mean change in c-PDS from baseline to 6-months for those in the control groups was -1.5 points, ranging from -7.8 to 7.4 points. The mean change for those in the test groups was 1.7 points, ranging from -6.3 to 9.4 points.

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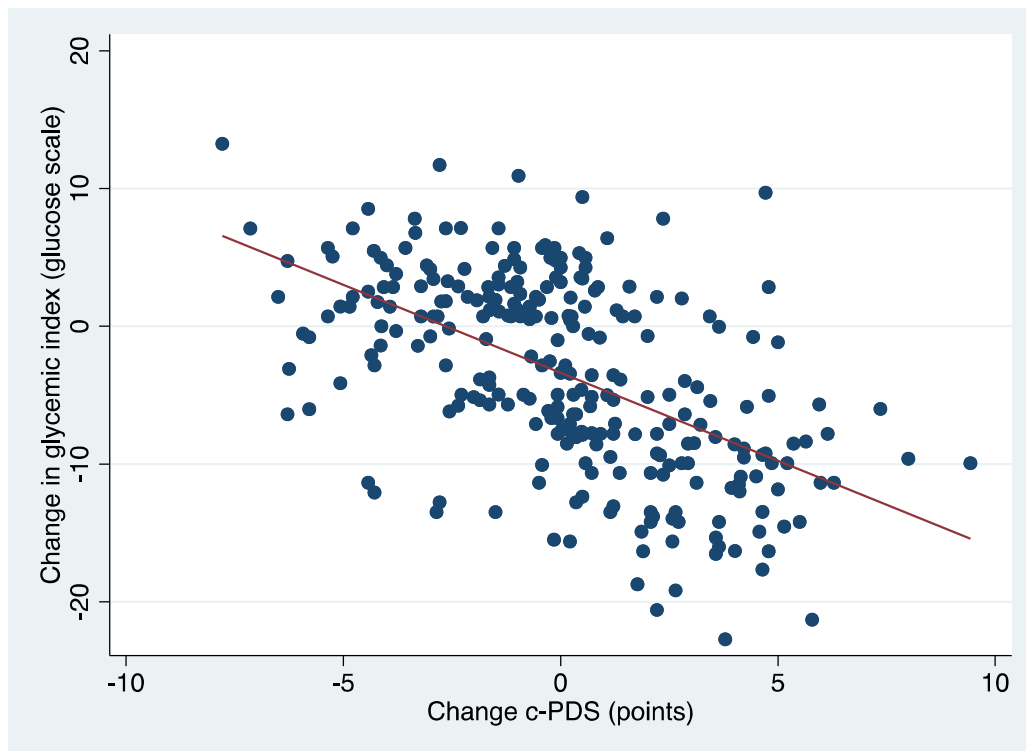
**Figure S3:** Change in the clinical Portfolio Diet Score by pillars shown by the control (high fibre dietary advice) and test (low glycemic index dietary advice) groups.

Abbreviations: C, control; c-PDS, clinical Portfolio Diet Score; MUFA, monounsaturated fatty acid; T, test.

The center line in each box represents the 50th percentile (median change). The bottom of each box represents the 25th percentile and the top of each box represents the 75th percentile. The whiskers represent the upper and lower extremes with dots showing outliers. All are presented as change in c-PDS points except dietary pulses (grams).



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**Figure S4:** Change in clinical-Portfolio Diet Score verses change in the dietary glycemic index.

Abbreviations: c-PDS, clinical Portfolio Diet Score.

$r = -0.55$  per c-PDS point,  $P < 0.001$

Abbreviations: c-PDS, clinical Portfolio Diet Score; GI, glycemic index.

GI is presented on the glucose scale, where the GI of glucose is 100.