

Effect of fruit and vegetable concentrates on endothelial function in metabolic syndrome: a randomized controlled trial.

Ali A, Yazaki Y, Njike VY, Ma Y, Katz DL. Effect of fruit and vegetable concentrates on endothelial function in metabolic syndrome: a randomized controlled trial. Nutr J. 2011 Jun 29;10:72. doi: 10.1186/1475-2891-10-72. PMID: 21714890; PMCID: PMC3135513.

BACKGROUND

- + There is a strong relationship between fruit and vegetable consumption and reduced risk of cardiac risk.
 - + This could be mediated via improvements on blood pressure, platelet function and vascular reactivity.
 - + The populations fruit and vegetable consumption is suboptimal.
 - + Dehydrated fruit, vegetable and berry concentrates could provide an accessible form of supplementation to bridge the gap between actual fruit and vegetable intake and recommendations.
 - + Endothelial function may be acutely impaired by consuming a glucose load.
- Antioxidant interventions could mitigate acute endothelial dysfunction induced by hyperglycemia.

AIM

The primary aim of this study was to determine whether taking commercially available encapsulated fruit and vegetable juice powder concentrate could improve endothelial function — a risk factor for type 2 diabetes and cardiovascular disease — in people with metabolic syndrome compared to placebo.

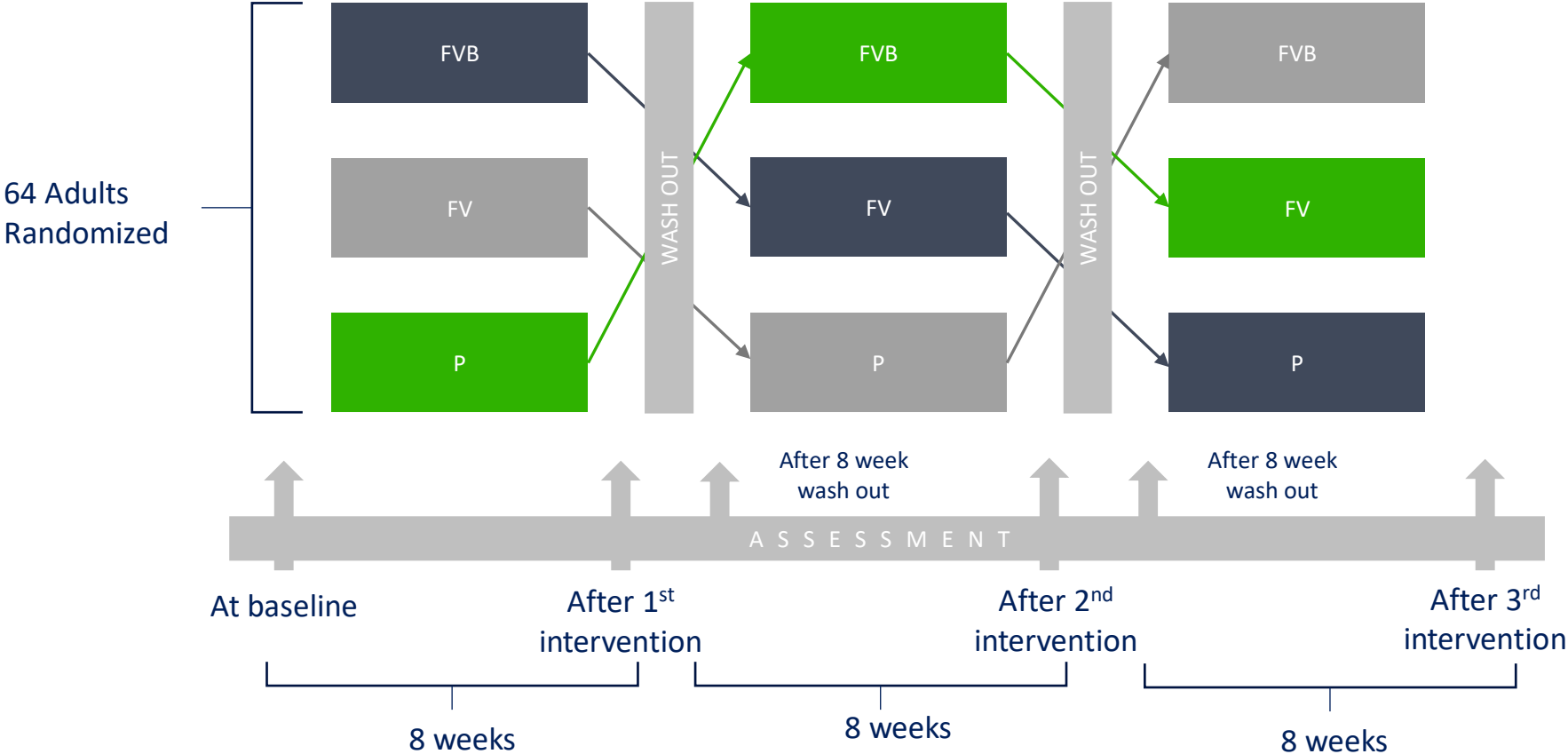
METHODS

Randomized, double-blind, placebo-controlled crossover study:

- ✚ 64 non-smoking adults with metabolic syndrome randomized in 3 groups
 - Blend 1: fruit, vegetable and berry juice powder concentrate (FVB)
(Juice Plus+)
 - Blend 2: fruit and vegetable juice powder concentrate (FV)
(Juice Plus+)
 - Placebo (P)
- ✚ Endothelial function assessed using FMD (flow-mediated dilatation)
- ✚ Primary outcomes: the difference in FMD between Blend 1 & 2 and placebo after a 2h oral glucose tolerance test following 8 weeks of supplementation.
- ✚ Secondary outcomes:
 - Acute effects on endothelial function and plasma glucose 2 hours after supplementation
 - Long term effects: plasma glucose, serum insulin, serum lipids, body weight

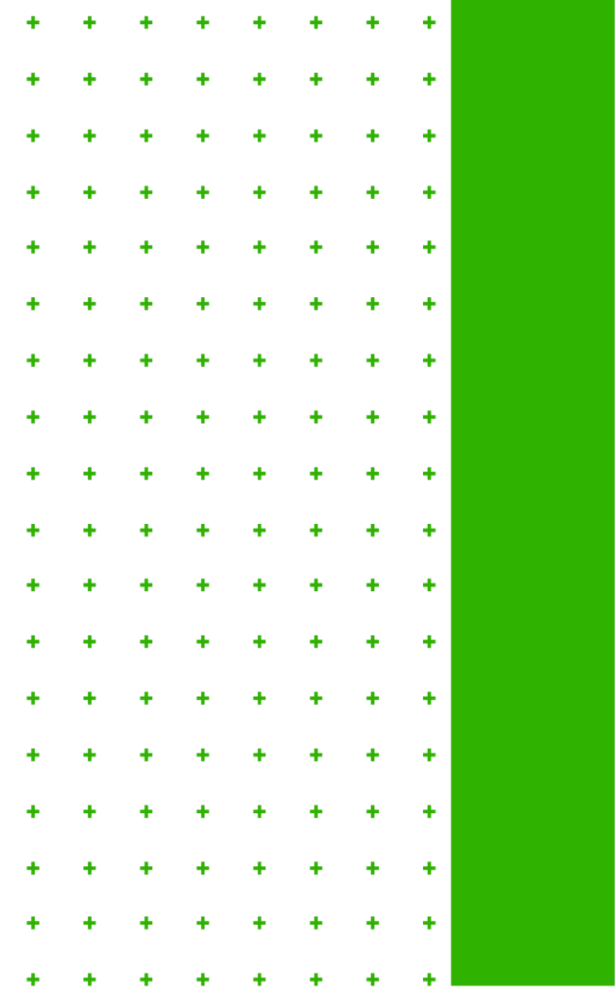
Crossover design: all
groups cycled through
all treatment arms

METHODS-STUDY TIMELINE



MAIN RESULTS

- + Endothelial function: compared to placebo, no significant differences were found in FMD between baseline and 8-week supplementation of FVB or FV
- + Serum measures:
 - no significant changes in serum insulin in either intervention group,
 - no significant differences between FVB, FV and placebo in fasting plasma glucose and total cholesterol
- + Weight did not change in any group after 8 weeks
- + Stratified analyses, showed no differences between men and women.
- + Acute (single dose) effects of FVB trended toward a significant improvement in endothelial function 2h after a 75g glucose load (compared to baseline)



CONCLUSION

“Encapsulated fruit and vegetable concentrates did not alter insulin or glucose measures. Acute endothelial dysfunction was not observed with glucose loading, mitigating against observable treatment effects. Further study with more overt impairment of endothelial function is warranted.”