Reviewer’s report

Title: A randomised controlled crossover trial investigating the short-term effects of different types of vegetables on vascular and metabolic function in middle-aged and older adults with mildly elevated blood pressure: the VEgetableS for vaScular hEaLth (VESSEL) study protocol

Version: 0  Date: 22 Oct 2019

Reviewer: Xiaoran Liu

Reviewer's report:

Re: NUTJ-D-19-00280
Short-term effects of different types of vegetables on blood pressure, glycemic control, oxidative stress, and inflammation: a randomised controlled crossover study protocol

The present study aims to evaluate the effects of consumption of different types of vegetable over one week on blood pressure and other cardiometabolic risk factors in a randomized, cross-over trial among mid to old age Australians. In the present study, eligible participants will be randomized to either a cruciferous vegetables soup or a starchy vegetables soup for a week. Increasing consumption of fruits and vegetables has been associated with benefits in cardiometabolic health. Previous evidence suggested that behavioral intervention and consultation had minimum effects on increasing fruits and vegetable intake. The proposed study will have the opportunity evaluating the feasibility and effectiveness on the consumption of cruciferous vegetables at a recommendation level in a randomized trial.

Major comments:

I highly recommend to keep blood pressure as the primary outcome and glycemic control as a secondary outcome. The co-primary outcome approach is not well justified and shifts the focus of this study. The underlying mechanisms of how cruciferous vegetables affect vascular health and glycemic response could be very different. It doesn't seem appropriate to include both of them as primary outcomes.

Given that the anticipated low intake of vegetables of participants' background diet, (2-3 serving/day, Ln 156), I would recommend to shorten the baseline period and extend the duration of intervention. Are there any justifications on the one week duration of intervention?

Description of the run-in diet and intervention diet was indeed not clear. It seems like participants will be on standardized diet + bread and butter diet during the one week baseline period and standardized diet + vegetable soup during the one week intervention period. If this is the case, I would suggest to reconstruct the paragraph between line150-166. It is really not clear what is the standardized diet. I would suggest to provide a sample menu to give a better understanding on the standardized lunch and dinner. Similarly it reads like both baseline diet and intervention diet are the same Ln 136-137,
Cruciferous vegetables are not high in carotenoid with the exception of kale. In the present study, the cruciferous soup consists of broccoli, cabbage, cauliflower, and kale, in conjunction with the short intervention period, I would hesitate to use carotenoid as a biomarker for compliance. Why not use the bioactive compounds exclusive to cruciferous vegetables (In 69-78) as biomarkers of compliance?

How about participants retention?

Specific comments:

Introduction:

1) In 43, "modifiable risk factors….is a health diets", heath diet is not a RF, either change to "modifiable factor" or "modifiable risk factors…is a low quality diet"

2) Page 3, paragraph 2, I would suggest to summarize the association between consumption of vegetables and cardiometabolic health in one or two sentences instead of list the association with each disease.

3) Page 4, paragraph 1, the aim of the study is to examine the effects of cruciferous vegetables on cardiometabolic health, indeed, it is the effects of a dietary patterns rather than individual nutrient. I would recommend to remove paragraph 1 or summarize it in one or two sentences.

Inclusion Criteria:

1) Ln 102 "and at least one additional risk factor for T2D and CVD…” Are there specific reasons to choose these RFs? These risk factors largely represent risk factors of metabolic syndrome (except total cholesterol).

2) Ln 107, what are the reasons excluding participants with BMI > 40 and those who regular use of antibacterial mouthwash (ln117-8)?

Compliance:

1) Ln 168 How many days of dietary record are collected i.e. random single day collection or multiple consecutive days? When will these dietary records be collected at baseline, during intervention? Please be specific.

2) How about data on participant's habitual diet?

Urine, blood, and saliva collection:

1) Ln 251 what are the purposes of collecting bacteria samples?
Level of interest
Please indicate how interesting you found the manuscript:

An article of importance in its field

Quality of written English
Please indicate the quality of language in the manuscript:

Not suitable for publication unless extensively edited

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

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