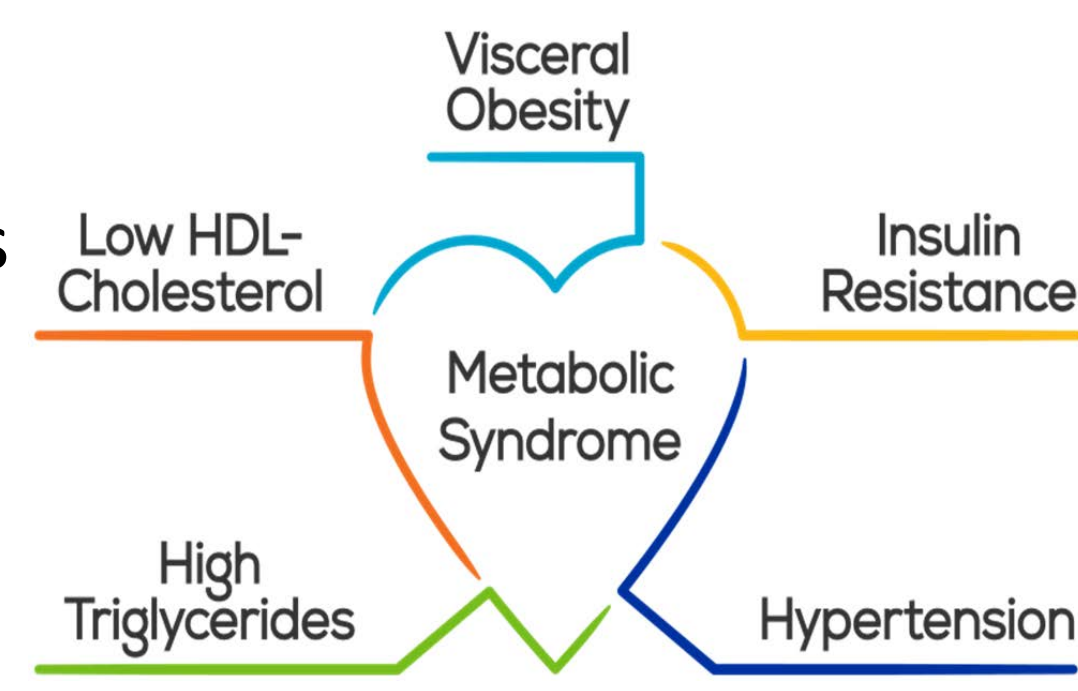


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## Background

Metabolic syndrome (MetS) is a group of conditions (high blood pressure, high blood lipids, high blood sugars, insulin resistance & large waist circumference) that increases the risk of cardiovascular diseases (CVD) and diabetes and is commonly managed in primary care.



Description of key strategies of the diet counselling process is needed to replicate results in new studies and promote uptake by others in team-based primary care.

We have published the CHANGE feasibility study i.e. The Canadian Health Advanced by Nutrition and Graded Exercise that achieved **19% reversal of MetS over one year**<sup>(1)</sup>.

This secondary analysis examined whether and to what degree the diet counselling could be linked to changes in diet quality.

## The CHANGE Feasibility Study<sup>(1)</sup>

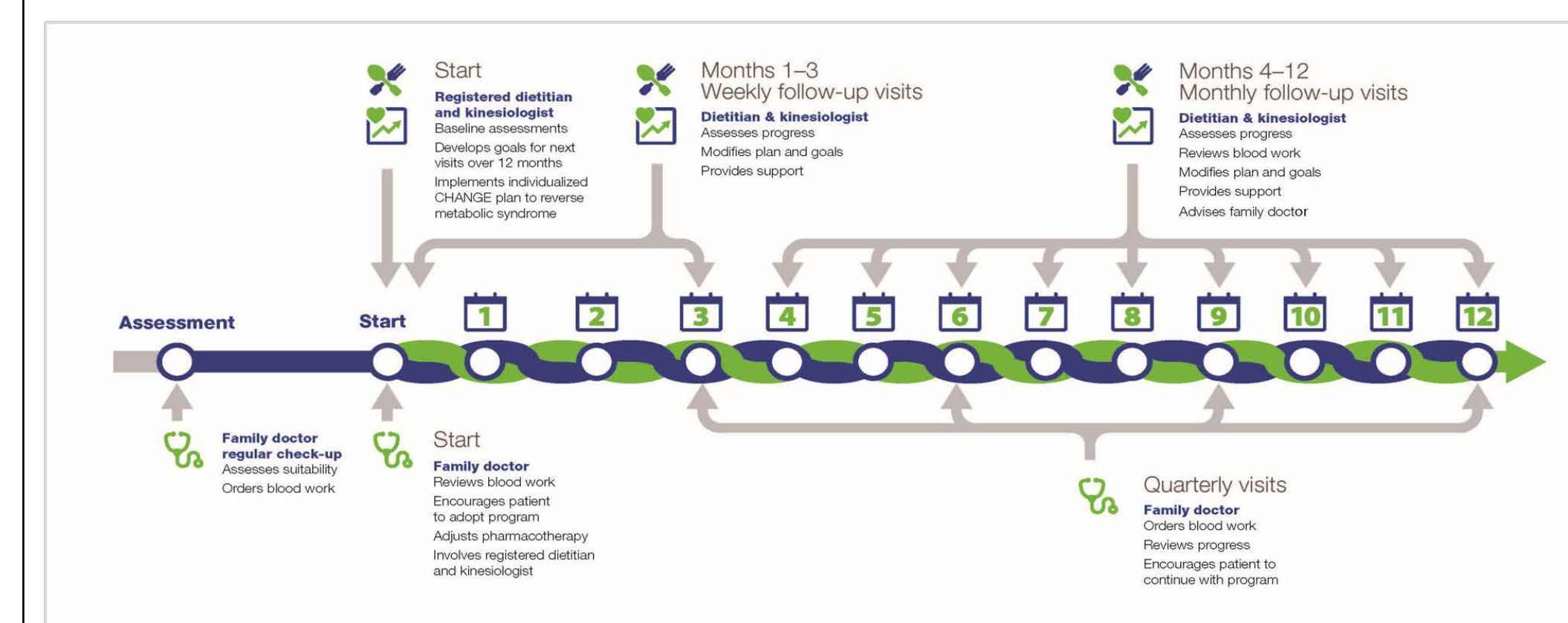
### Main Methods

Before-after study conducted from 2012-2015 at 3 Canadian clinics: Edmonton Oliver Primary Care Network; Unité de médecine familiale Laval, Québec & Polyclinic Family & Specialty Medicine, Toronto.

**Inclusion Criteria:** 1) at least 18 yrs age, 2) BMI<35, and 3) Presence of 3 out of 5 criteria for MetS.

**Exclusion Criteria:** Relevant medical, safety or logistic reasons and those deemed not to benefit from the intervention.

### Program Overview



#### Three key features:

- ✓ MDs recruited and mentored patients quarterly
- ✓ Intensive follow-up i.e. weekly for 12 weeks then monthly to one year by both Registered Dietitians (RD) and exercise specialists
- ✓ Multiple strategies and client-centred; flexible

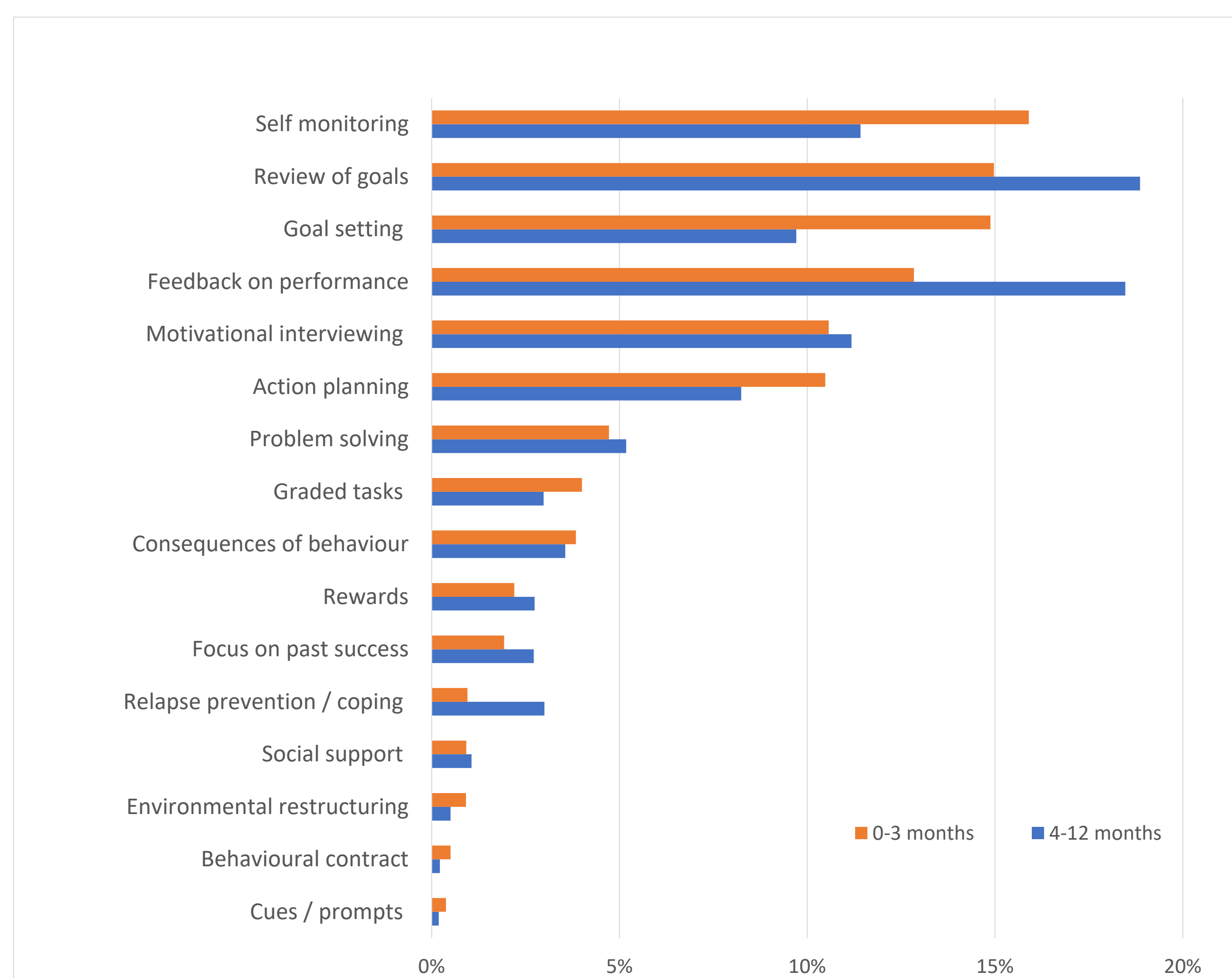
## Diet Counselling Secondary Analysis Methods

- 14 RDs provided individualized client centred counselling<sup>(2)</sup> and reported on strategies used.
- 2 x 24h recalls and food frequency questionnaires at baseline, 3 months and 12 months used to calculate diet quality based on Canadian Healthy Eating Index (HEI-C, scored from 0 to 100).<sup>(3)</sup>
- Diet quality assessed for associations with food behaviour goals and behaviour change techniques as reported by RDs:
  - 24 Food behaviour goals based on research evidence<sup>(2)</sup> including components from the Mediterranean diet plus 'other'.
  - 16 Behaviour change techniques according to CALO-RE taxonomy developed by Michie et al.<sup>(4)</sup> plus 'other', based on consensus
- Statistical Analysis: ANOVA conducted for univariate and adjusted associations for each Food behaviour goal and Behaviour change technique with 3 month HEI-C adjusted for baseline HEI-C.

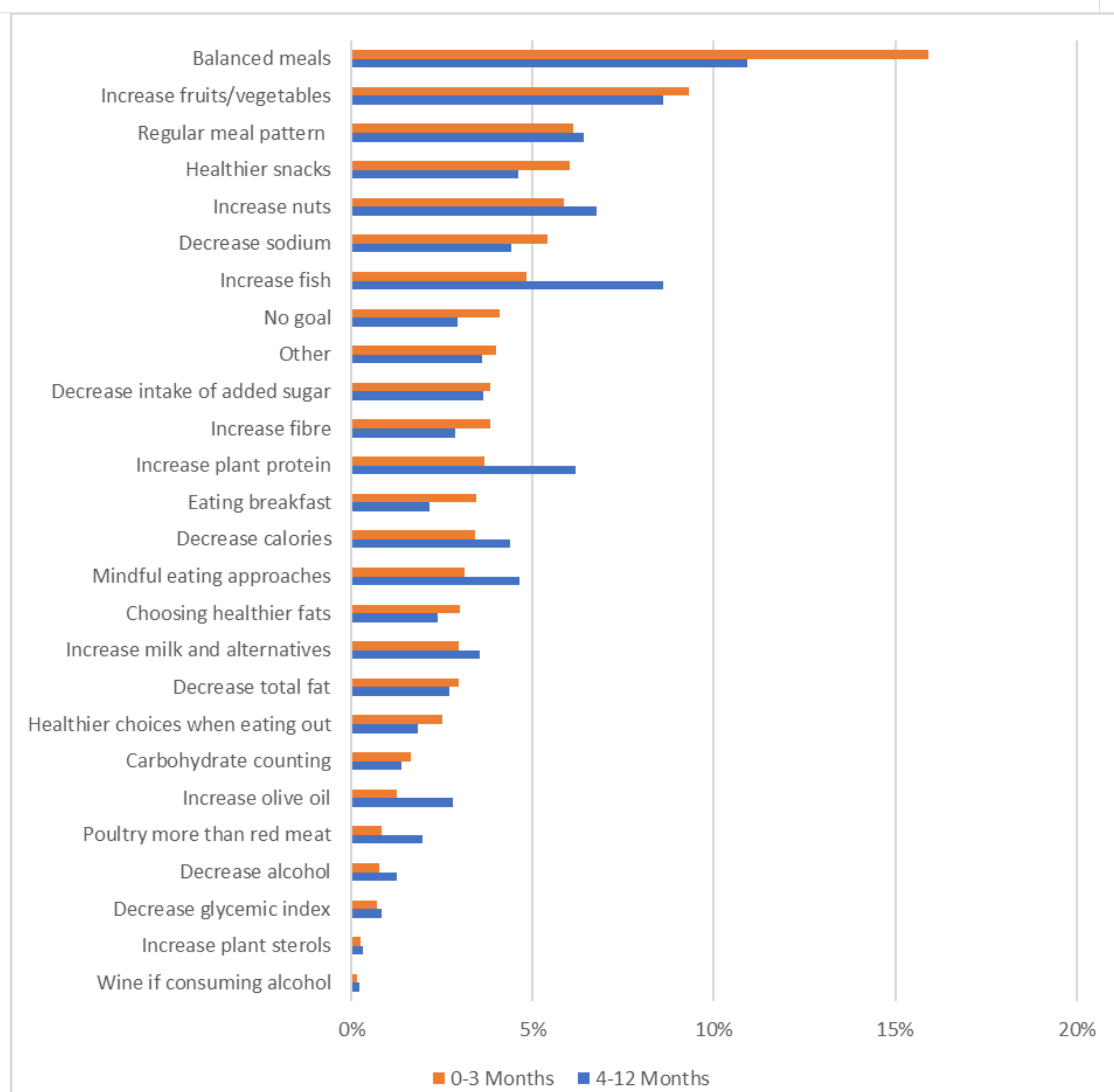
## Results

Of 293 enrolled in the study, 255 (87%) had complete HEI-C at 3 months and 206 (70%) completed the 12-month study.

**Diet quality improved at 3 months (HEI-C: 58±15 to 69±12) and was maintained<sup>(1, 5)</sup>.**



Frequency of Behaviour Change Techniques Overall



Frequency of Food Behaviour Goals Overall

## Significant Associations with Change in Diet Quality at 3 months

### Behaviour change techniques

- Goal setting was common, yet more goal setting (>3 times / 3 months) was associated with lower HEI-C (F test; P=0.007)
- Self monitoring was highly associated with increased HEI-C (P<0.001)

### Food behaviour goals

- Several positive additions to the diet were associated with improved HEI-C except the balanced meal concept, where more use (>2 times/3 months vs ≤2 times/3 months), was associated with lower HEI-C at 3 months)(F test; p<0.001).

Change in HEI-C at 3 months	Behaviour change technique	Food behaviour goal
Decreased HEI-C	Goal setting	Balanced meals
		Decrease alcohol
Increased HEI-C	Self-monitoring	Poultry more than red meat
	Focus on past success	Increase plant protein
	Feedback on performance	Increase fish
		Eating breakfast
		Increase milk / alt
		Healthier fats
		Increase olive oil
	Increase nuts	
	Increase fruits / veg	
	Healthier snacks	

## Conclusions

### The CHANGE Program:

- Resulted in a 19% reversal rate in MetS at 12 months and improved diet quality

### Key Process Measures:

- Documentation of both behaviour change techniques and food behaviour goals are highly relevant in diet counselling
- A summary diet quality score is a promising target for short term counselling success
- Results are promising for linking key process measures to indicators of diet quality change
- Further development of self-report documentation of key health behaviour change strategies for use in community-based studies is needed.

## References

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 Paper on this work is in press at BMC Nutrition.