

Systematic Review of Structured Diet and Exercise for Type 2 Diabetes Management (Preliminary Results)



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Background

- Diabetes Canada's 2018 guidelines suggest starting health behavior interventions (nutrition therapy, weight management, physical activity) at diagnosis of type 2 diabetes (T2DM), however little is known about reproducible and quantifiable strategies.
- Several systematic reviews exist on diet and exercise interventions, but they do not distinguish between general versus structured advice.
- The objective of this review is to assess how structured lifestyle interventions impact patient-important outcomes, such as macrovascular and microvascular complications.

Methods (Current or Completed)

- Design:** Systematic review and meta-analysis
- Data Sources:** A search was completed Nov 2018 of Ovid MEDLINE, In-Process, Ahead-of-Print, Versions, Ovid Embase, Cochrane Central Register of Controlled Trials, ClinicalTrials.gov, WHO International Clinical Trials Registry Platform, and Epistemonikos without restriction by language or date. Reference lists of included studies will be checked.
- Study Eligibility:** Randomized controlled trials (RCTs) and cluster-RCTs
- Participants:** Adults with a diagnosis of T2DM
- Interventions:** Intervention group must follow a diet and exercise regimen, where one or both must be structured (reproducible and quantifiable). The regimens must be pre-specified and able to be followed on daily or weekly basis.
- Comparator:** Unstructured and general usual care
- Outcomes:** A hierarchy of outcomes, as the following:

- All-cause mortality
- Cardiovascular mortality (death from myocardial infarction, stroke, peripheral vascular disease)
- Serious adverse events (hospitalization, prolonged hospitalization, urgent medical attention needed, events that result in persistent or significant disability)
- Patient important outcomes (non-fatal myocardial infarction or stroke, cardiac or peripheral vascularization, heart failure, nephropathy, retinopathy, ulceration, amputation, neuropathy)
- Adverse events and withdrawal due to adverse events
- Other (quality of life, cost, surrogate markers)

- Exclusion Criteria:** Metabolic syndrome, impaired glucose tolerance, diet-only, exercise-only, no usual care comparator
- Screening:** One reviewer screened titles and abstracts. Two reviewers are independently screening full-text articles.
- Data Extraction:** Full texts are being extracted by two authors independently using a pilot standardized form.

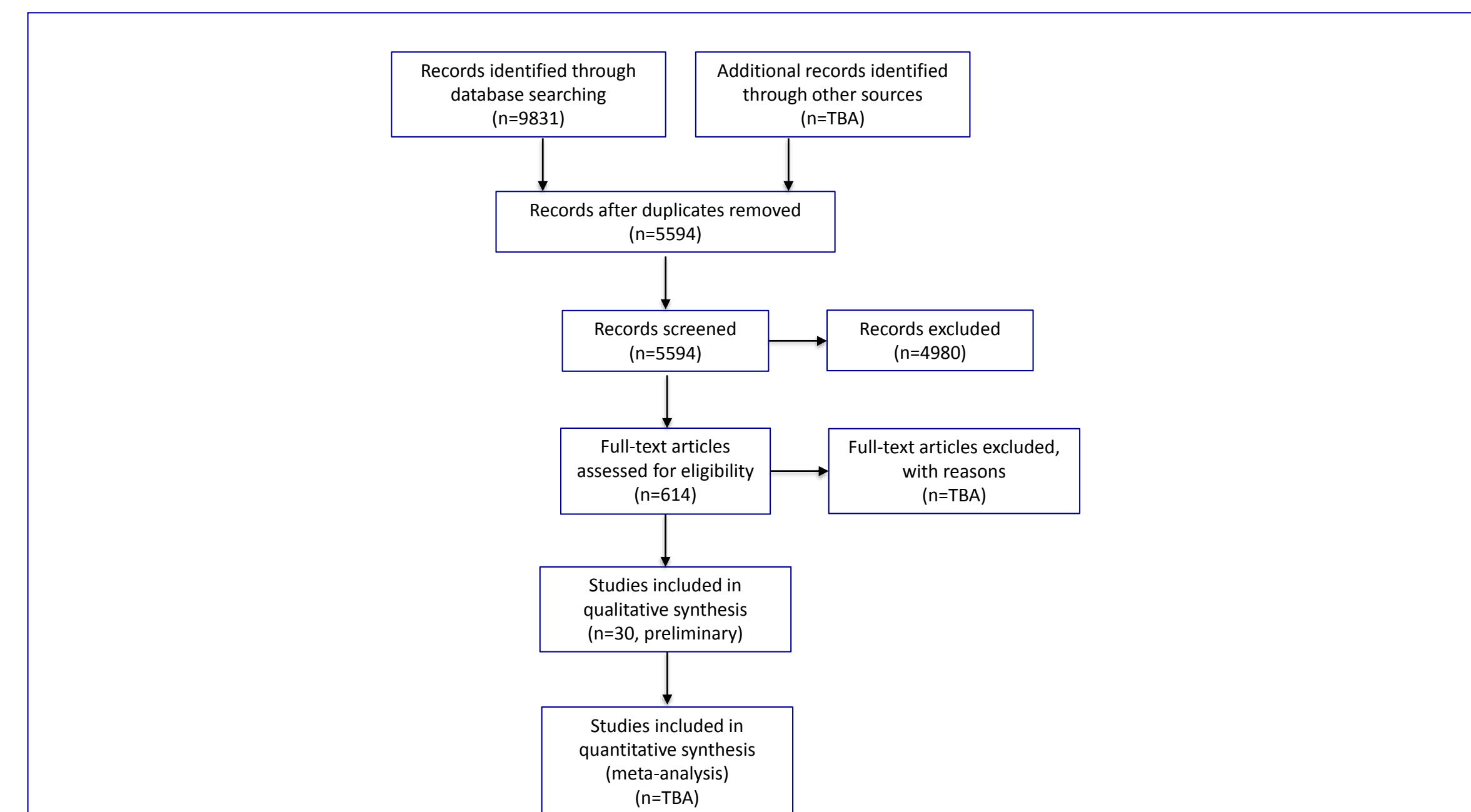


Figure 1: PRISMA 2009 Flow Diagram (Preliminary Results)

Table 1: Patient Characteristics in Included Studies (Preliminary Results)

Age	36 – 64 years
Body Mass Index	25 – 45 kg/m ²
Time since T2DM diagnosis	4 – 19 years
Gender	~ 40 – 60% males
Ethnic Origins	Caucasian, African American, Hispanic, Asian, Native American

Note: Included studies with available data from full text. Range of means reported

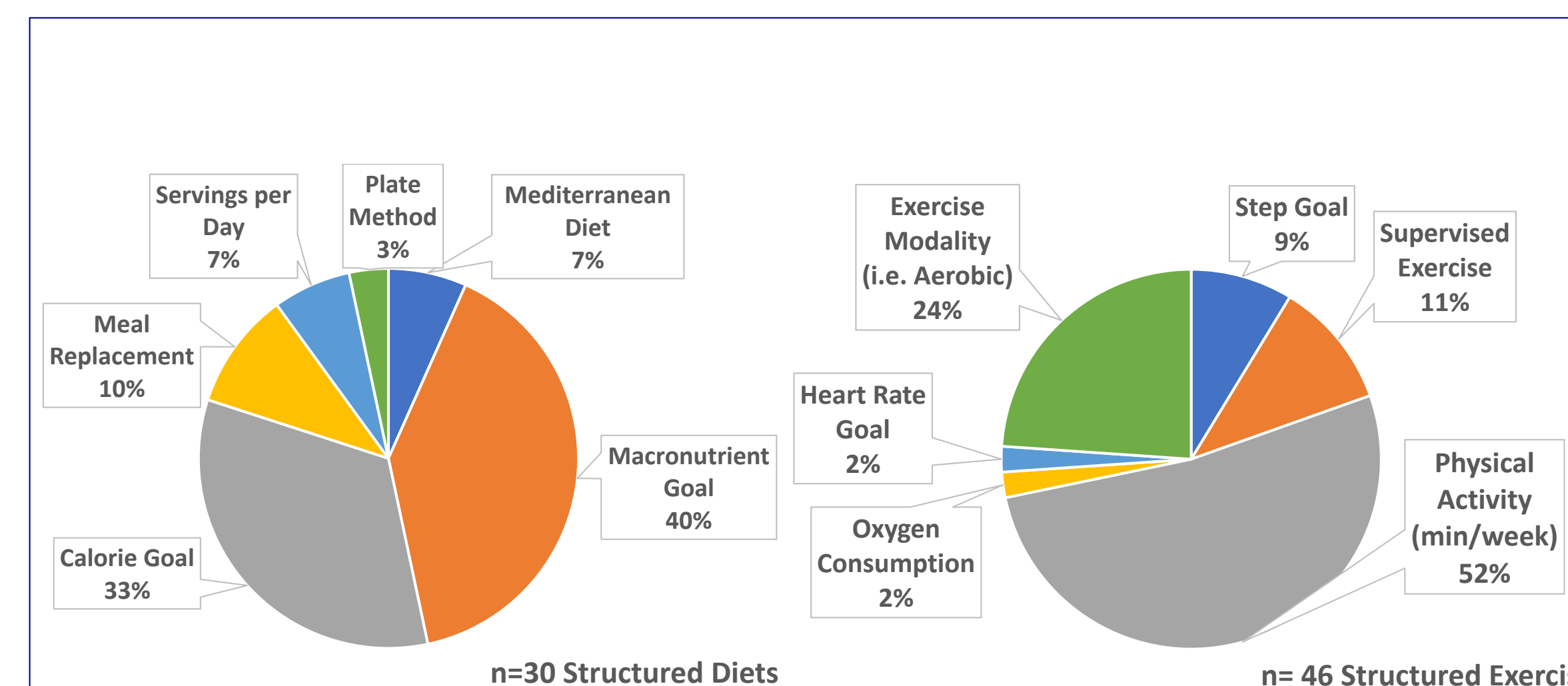


Figure 2: Types and Frequency of Structured Interventions (Preliminary Results)

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Table 2: Outcomes Reported by Included Studies (Preliminary Results)

	n= 30 studies
All-cause mortality	0 studies
Cardiovascular mortality	1 study
Serious adverse events	2 studies
Patient-important Outcomes	
• Cardiovascular	1 study
• Renal	1 study
Adverse events and withdrawal due to adverse events	2 studies
Additional Outcomes	
• A1C	23 studies
• Weight	22 studies
• Lipid Surrogates	16 studies
• Physical Activity	15 studies
• Diet	11 studies
• Psychosocial Outcomes	9 studies
• Change in Medications	6 studies

Limitations and Challenges

- Structured lifestyle interventions are difficult to define in titles and abstracts
- Unclear definition:** "...participants either rested or performed two 90 min bouts of treadmill exercise (separated by 3.5 h) at 80% of their ventilatory threshold" (Eshghi 2017)
- Unclear definition:** "...in total 114 full-time hours, focusing on food preferences and selections, and physical exercise" (Haglin 2011)
- Interventions that were of diet or exercise alone, or were not compared to a control group, were excluded from this review

Methods (Next Steps)

- Results:** Quantitative analysis on intention-to-treat results are pending. Absolute risk reductions and numbers needed to treat will be calculated
- Risk of bias:** Assessment will be completed by two authors in duplicate using the Cochrane Risk of Bias Tool
- Meta-analysis (if possible):** Relative risks (RR) and the fixed-effects or random-effects model, based on the presence or absence of heterogeneity, will be used to combine outcomes across trials
- Subgroup analysis:** Analysis will be performed on patients with A1C ≤9% and A1C >9%