doi: 10.1111/obr.12423

Obesity Comorbidity/Treatment

A systematic review of commercial weight loss programmes' effect on glycemic outcomes among overweight and obese adults with and without type 2 diabetes mellitus

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Received 20 August 2015; revised 25 March 2016; accepted 25 March 2016

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Summary

Objective: We examined the glycemic benefits of commercial weight loss programmes as compared with control/education or counselling among overweight and obese adults with and without type 2 diabetes mellitus (T2DM).

Methods: We searched MEDLINE, Cochrane Database of Systematic Reviews, and references cited by individual programmes. We included randomized controlled trials of ≥12 weeks duration. Two reviewers extracted information on study design, population characteristics, interventions, and mean changes in haemoglobin A1c and glucose.

Results: We included 18 randomized controlled trials. Few trials occurred among individuals with T2DM. In this population, Jenny Craig reduced A1c at least 0.4% more than counselling at 12 months, Nutrisystem significantly reduced A1c 0.3% more than counselling at 6 months, and OPTIFAST reduced A1c 0.3% more than counselling at 6 months. Among individuals without T2DM, few studies evaluated glycemic outcomes, and when reported, most did not show substantial reductions.

Discussion: Few trials have examined whether commercial weight loss programmes result in glycemic benefits for their participants, particularly among overweight and obese individuals without T2DM. Jenny Craig, Nutrisystem and OPTIFAST show promising glycemic lowering benefits for patients with T2DM, although additional studies are needed to confirm these conclusions. © 2016 World Obesity

Keywords: Commercial weight loss, glucose, haemoglobin A1c, type 2 diabetes mellitus.

obesity reviews (2016) **17**, 758–769

Introduction

The Centers for Disease Control has estimated that 29.1 million US adults have type 2 diabetes mellitus (T2DM), of which 8.1 million remain undiagnosed (1). The increasing prevalence of obesity has coincided with an increase in the T2DM prevalence (2) and growing costs of T2DM management (3). Two-thirds of US adults are overweight or obese (4), placing them at increased risk for developing T2DM (5,6).

The Diabetes Prevention Program (DPP) trial demonstrated that overweight/obese adults with prediabetes who lost at least 2.5 kg at 2 years through lifestyle intervention significantly reduced their risk of developing T2DM (7). In

the Action for Health in Diabetes (Look AHEAD) trial, adults with T2DM who lost weight through lifestyle intervention had greater improvements in haemoglobin A1c and reduced need for diabetes medications than controls (8). DPP and Look AHEAD demonstrate the glycemic benefits of weight loss, although attaining similar results in the community could be more challenging given that patients tend to be less activated than individuals willing to participate in a clinical trial. In addition, both DPP and Look AHEAD used intensive lifestyle interventions, which may not be readily available to many patients in the community (9).

In contrast, commercial weight loss programmes are common across the US and other countries. Clinicians might be considering referrals to these programmes as a substitute. Our previous review found that Weight Watchers and Jenny Craig decreased weight significantly more than control/education or counselling at 12 months and that other programmes had modest to no greater weight loss than comparator (10). While weight loss is a strong driver of glycemic improvement (7,8), it is critical to verify that commercial programmes achieve the anticipated glycemic benefits – particularly if clinicians are considering referral to these programmes. In addition, these programmes vary with respect to their intensity and their encouraged lifestyle changes, which may deviate substantially from DPP and Look AHEAD. Therefore, the glycemic changes might not follow expected patterns. For example, participants on a weight-maintaining, low-carbohydrate diet have greater reductions in haemoglobin A1c than those on a low-fat diet (11). Overall, knowing whether these programmes also result in similar improvements in glycemic control to DPP or Look AHEAD may justify broader recommendation and use of commercial weight loss programmes.

Prior systematic reviews have only examined the efficacy of commercial programmes for weight loss (10,12), and none have examined the effect of these programmes on glycemic outcomes such as haemoglobin A1c or glucose. Our objective was to examine the glycemic benefits of commercial or proprietary weight loss programmes as compared with control/education or counselling among overweight/obese individuals with and without T2DM.

Methods

Identification and selection of weight loss programmes

We generated a list of 141 commercial and proprietary weight loss programmes through several sources: obesity experts, US News and World Report rankings, and Internet searches. We included 32 commercial or proprietary programmes available in the US that emphasized nutrition and behavioural counselling/social support components with or without physical activity (Table S1). Details on the programme selection have been previously described (10).

Protocol and registration

We developed a study protocol based on the 2005 systematic review (12) and made it publicly available online on PROSPERO (CRD42014007155). We have previously described our methods in detail (10) in an article presenting our primary outcome of mean percentage weight change. We established haemoglobin A1c and glucose as secondary outcomes *a priori*.

Data sources and search strategy

We used three data sources to identify citations: MEDLINE, Cochrane Database of Systematic Reviews, and the commercial or proprietary weight loss programmes themselves. Our search strategy has been published previously (10). We searched MEDLINE for articles published from October 2002 through November 2014. We screened all articles included in the prior review (12), which searched MEDLINE from inception through October 2003. We searched the Cochrane Database of Systematic Reviews from inception to November 2014 using a similar search strategy as our MEDLINE search. We contacted all included programmes to request bibliographies of published studies and unpublished data using their programme and reviewed their websites for citations.

Study selection

Two study team members independently reviewed and screened articles against pre-specified eligibility criteria (Table S2). We included randomized controlled trials (RCTs) among overweight and obese adults with or without T2DM that compared a commercial or propriety weight loss programme to control/education or counselling. Glycemic outcomes are relevant to overweight and obese individuals given their increased risk of T2DM (5,6,13), although most trials did not fully characterize this population's risk profile (e.g., prediabetes, history of gestational diabetes, etc). Comparators were defined as 'control/education' if participants received no intervention, only printed materials, health education curriculum, or engaged in less than three sessions with a provider during the study period and as 'counselling' if participants had three or more consultations with a provider during the intervention. To be included, RCTs needed to be 12 weeks duration or greater.

Data extraction and risk of bias assessment

Two team members extracted data on study design, setting, population characteristics and intervention characteristics. In this article, our primary outcomes included mean changes

in haemoglobin A1c and fasting glucose. Our secondary outcome was change in diabetes medications among individuals with T2DM. We have previously reported weight loss, adherence and adverse event outcomes from these same studies and therefore do not report them here (10).

Two reviewers independently assessed the risk of bias (ROB) for each included study using the Cochrane Collaboration's tool (14). We rated a trial's overall ROB at a time point by examining the following domains: selection bias based on inadequate generation of a randomized sequence, detection bias based on lack of outcome assessor blinding and attrition bias. We designated a trial as 'low' ROB if all domains were low; as 'unclear' if all domains were unclear; as 'high' if any domain was high; and otherwise were considered 'moderate'. We characterized the ROB for each programme's body of evidence by examining the overall ROB for relevant trials. For each programme, we rated the ROB across trials as 'low' if most studies were low; as 'high' if most trials were high; and otherwise as 'moderate'.

Data synthesis and analysis

For all comparisons, we calculated and display the between-group mean differences with 95% confidence intervals, if calculable, for individual RCTs grouped by comparison. We report outcomes separately for individuals with T2DM and without T2DM, as differing results would be expected for glycemic outcomes for these two populations. We did not perform meta-analyses given the trials' heterogeneous study populations, variable comparator arms, varying analysis types and failure to report variance estimates for difference-in-differences.

Results

Of the 4,212 citations evaluated, we included 18 trials reported in 32 articles or unpublished reports (Fig 1) on 9 programmes out of the 32 eligible. Table S3 provides details on study and population characteristics, attrition and ROB ratings for all trials.

Studies among overweight and obese individuals with type 2 diabetes mellitus

In studies of individuals with T2DM, mean age ranged from 52 to 59 years, most were female, and BMI ranged from 32 to 39 kg/m^2 (Table 1).

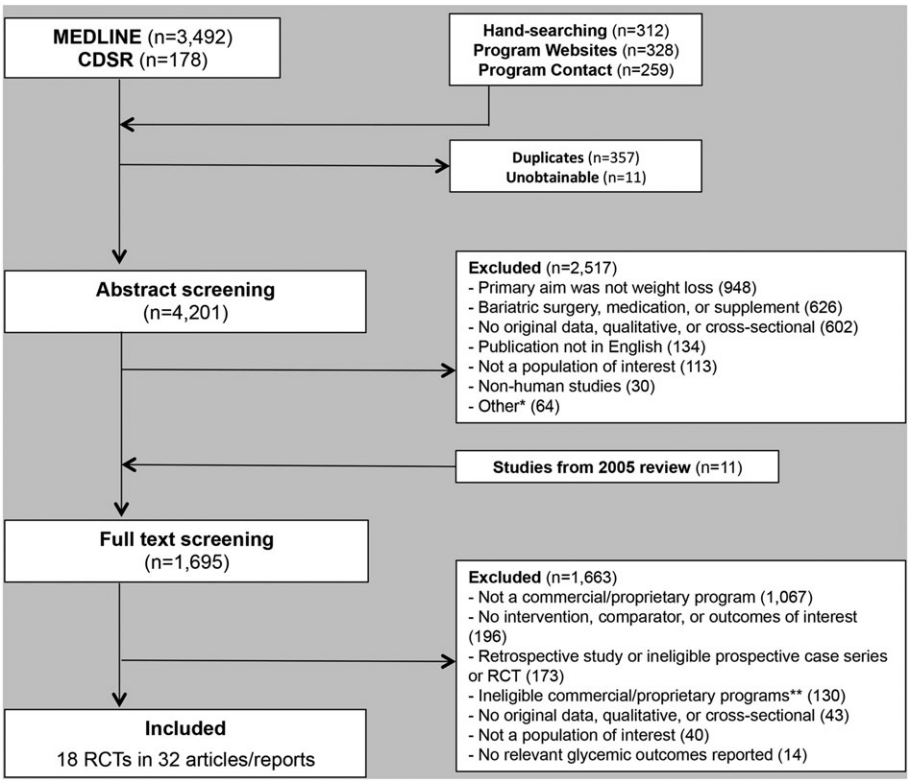

Figure 1 Summary of evidence search and selection. *Other exclusions included trials with ineligible study designs (retrospective case series, RCT < 12 weeks duration, etc) or ineligible programmes (not available in the USA, etc). **Ineligible commercial programmes include those that use medications or supplements, modified specifically for the study, unavailable in the USA, or available only to special populations like active duty military or veterans. CDSR, Cochrane Database of Systematic Reviews; RCT, randomized controlled trial.

Table 1 Population characteristics among included randomized controlled trials, by programme and comparator among overweight and obese individuals with type 2 diabetes mellitus

Commercial programme	Comparator	RCTs, *n* (*N* eligible)	Ranges of baseline population characteristics						RCTs with commercial programme support, *n*
			Study duration, *months*	Mean age, *years*	Women, %	White, %; Black, %	Mean BMI, kg/m^2	Mean glucose, *mmol/L*	
Market-leading programmes									
Jenny Craig	Control/education	0	—	—	—	—	—	—	—
	Counselling	1 (227)	12	57	47–58	78–82; 3–10	36	8.05–8.10	1
NutriSystem	Control/education	1 (69)	3	53	68–74	37–44; 44–60	39	8.30–8.40	1
	Counselling	1 (100)	6	56	58–60	32–40; 54–64	36	8.00–8.96	1
Intensive very-low-calorie or low-calorie meal replacement programmes									
OPTIFAST	Control/education	0	—	—	—	—	—	—	—
	Counselling	1 (93)	6	52	63–67	NR; NR	38	12.19–12.81	0
Self-directed and other programmes									
SlimFast	Control/education	0	—	—	—	—	—	—	—
	Counselling	2 (139)	3–12	54–59	33–41	NR; NR	32–34	8.96–9.18	2
Atkins	Control/education	0	—	—	—	—	—	—	—
	Counselling	2 (136)	12–24	54	74–82*	14–15*; 62–66*	35–37*	NR	2

*Not all trials reported this characteristic.

BMI, body mass index; NR, not reported; RCT, randomized controlled trial.

Market-leading programmes: Weight Watchers, Jenny Craig and Nutrisystem

One RCT compared traditional and low-carbohydrate versions of Jenny Craig with counselling (15). Jenny Craig participants reduced A1c by 0.4% to 0.8% greater than counselling at 12 months (Fig. 2) (ROB: high). Insulin was reduced/stopped in 8% of counselling participants as compared with 63% of traditional Jenny Craig and 90% of low-carbohydrate Jenny Craig participants (Table 2). Oral hypoglycemic medications were decreased/stopped in 16% of counselling, 39% of traditional Jenny Craig and 32% of low-carbohydrate Jenny Craig participants at 12 months (Table 2). The trial only provided pooled variance estimates for the intervention arms when reporting between-group differences for A1c, glucose and medication changes (which were all statistically significant); therefore, we cannot report statistical significance for the individual comparisons.

Two RCTs examined Nutrisystem in patients with T2DM – one compared the intervention with control/education (16) and the other with counselling (17). Neither trial examined outcomes at 12 months. Relative to comparators, Nutrisystem resulted in significantly greater short-term reductions in A1c (Fig. 2) (ROB: moderate). As compared with counselling, Nutrisystem significantly reduced use of hypoglycemic medications (Table 2).

We identified no trials of Weight Watchers among patients with T2DM.

Intensive very-low-calorie or low-calorie meal replacement programmes: health management resources and OPTIFAST

One RCT compared OPTIFAST to counselling (18), which only reported completers' analyses. At 6 months, OPTIFAST reduced A1c 0.3% more than counselling (ROB: high) (Fig. 2). The trial did not report variance estimates for between-group differences; thus, we cannot report statistical significance.

We identified no trials of health management resources (HMR) among patients with T2DM that met our inclusion criteria.

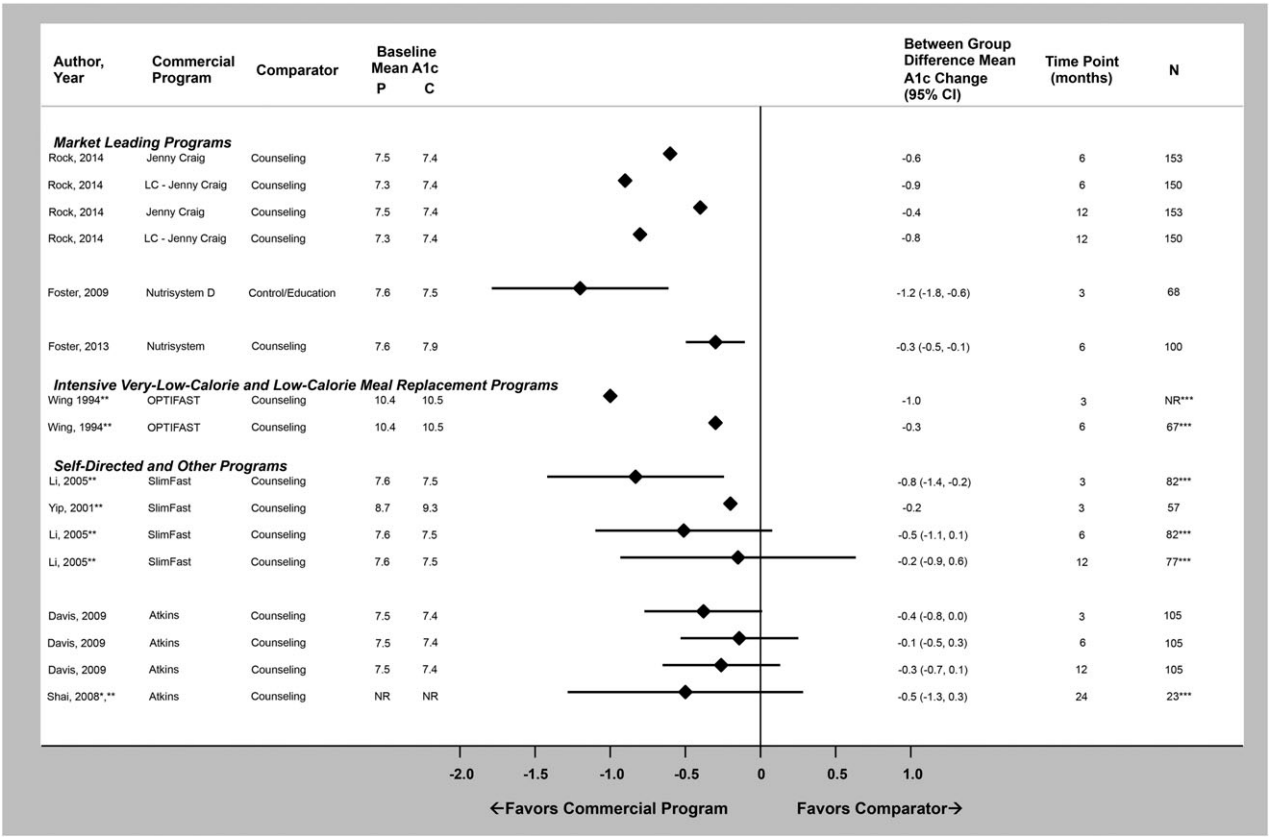

Figure 2 Difference in mean haemoglobin A1c change (%) between commercial programmes and comparators among overweight and obese populations with type 2 diabetes mellitus, displayed by time point. Diamond size is standardized across trials and does not reflect sample size analysed. *Results reported in more than one article. **Results from completers' analysis only. ***Trials where reported attrition was not reported or was high (attrition ≥30% in one arm or difference in attrition between arms was ≥20%). C, comparator; LC, low carbohydrate version; NR, not reported; P, commercial programme.

Table 2 Changes in diabetes medications in patients with type 2 diabetes mellitus

Author, year	Duration, *months*	Eligible arms	Overall *N* *N* on insulin *N* on oral hypoglycemics	Reduction in insulin, %	Reduction in oral hypoglycemics, %
Rock, 2014 (15)	12	Counselling	76 12 62	8	16
		Jenny Craig	74 19 62	63	39
		LC - Jenny Craig	77 10 69	90	30
Foster, 2013 (17)	6	Counselling	50 11 47	—	4*
		Nutrisystem	50 9 47	—	28*,**
Li, 2005 (19)	12	Counselling	36 0 36	—	18 (sulfonylurea); 23 (metformin)
		Slimfast	46 0 46	—	40 (sulfonylurea)**; 29 (metformin)**
Yip, 2001 (20)	3	Counselling	16 0 16	—	38
		Slimfast	41 0 41	—	59

*Overall reduction in diabetes medications reported.
**$P < 0.05$ for comparison with comparator arm.
LC, low carbohydrate.

Self-directed and other programmes: SlimFast, Atkins, the biggest loser club and curves

Two RCTs compared SlimFast with counselling (19,20), which only reported completers' analyses. One trial reported outcomes at 12 months (19), and there was no significant difference in A1c change between SlimFast and counselling at this time point (Fig. 2) (ROB: high). SlimFast participants had greater reductions oral hypoglycemic agents as compared with counselling (Table 2).

Two RCTs compared Atkins with counselling (21–24), one of which only reported completers' analyses (22–24). There were no significant differences in A1c between Atkins and counselling at any time point (Fig. 2) (ROB: high).

We identified no trials of The Biggest Loser Club or Curves among patients with T2DM.

Studies with overweight and obese individuals without type 2 diabetes mellitus

In studies of individuals without T2DM, mean age ranged from 39 to 54 years, most were female and BMI ranged from 31 to 37 kg/m^2 (Table 3). The reported mean glucose values were not typically in the prediabetes range (5.6 to 6.9 mmol/L).

Market-leading programmes: Weight Watchers, Jenny Craig, and Nutrisystem

Three RCTs compared Weight Watchers with control/-education (25–30). Weight Watchers significantly lowered glucose at 6 months compared with control/education in one trial (29,30), but no significant between-group differences existed in mean glucose change at 12 months (Fig. 3) (ROB: high).

We identified no trials of Jenny Craig or Nutrisystem in patients without T2DM that met our inclusion criteria.

Intensive very-low-calorie or low-calorie meal replacement programmes: health management resources and OPTIFAST

One RCT compared a low-calorie version of HMR with counselling (31). No trials continued to 12 months. At

Table 3 Population characteristics among included randomized controlled trials, by programme and comparator among overweight and obese individuals without type 2 diabetes mellitus

Commercial programme	Comparator	RCTs, *n* (N eligible)	Ranges of Baseline Population Characteristics						RCTs with commercial programme support, *n*
			Study duration, *months*	Mean age, *years*	Women, %	White, %; Black, %	Mean BMI, kg/m^2	Mean glucose, *mmol/L*	
Market-leading programmes									
Weight Watchers	Control/education	3 (1,314)	3–24	40–48	72–88	74*; 13*	31–34	4.94–5.53*	2
	Counselling	0	—	—	—	—	—	—	—
Intensive very-low-calorie or low-calorie meal replacement programmes									
HMR	Control/education	0	—	—	—	—	—	—	—
	Counselling	1 (38)	6	45–51	75–77	91–94; 6–9	35–36	4.84–5.17	0
Self-directed and other programmes									
SlimFast	Control/education	3 (275)	3–12	39–50	35–82	NR; NR	32–34	4.37–6.33	2
	Counselling	0	—	—	—	—	—	—	—
Atkins	Control/education	1 (118)	12	41	75	NR; NR	32	4.48	0
	Counselling	3 (432)	6–24	40–52	9–100	59–79*; 3–12*	31–37	5.00–5.33*	1
The Biggest Loser Club	Control/education	1 (203)	3	42	59	NR; NR	32	4.80–5.00	1
	Counselling	0	—	—	—	—	—	—	—
Curves	Control/education	1 (48)	3	48	100	NR; NR	36	NR	1
	Counselling	0	—	—	—	—	—	—	—

*Not all trials reported this characteristic.

BMI, body mass index; HMR, health management resources; NR, not reported; RCT, randomized controlled trial.

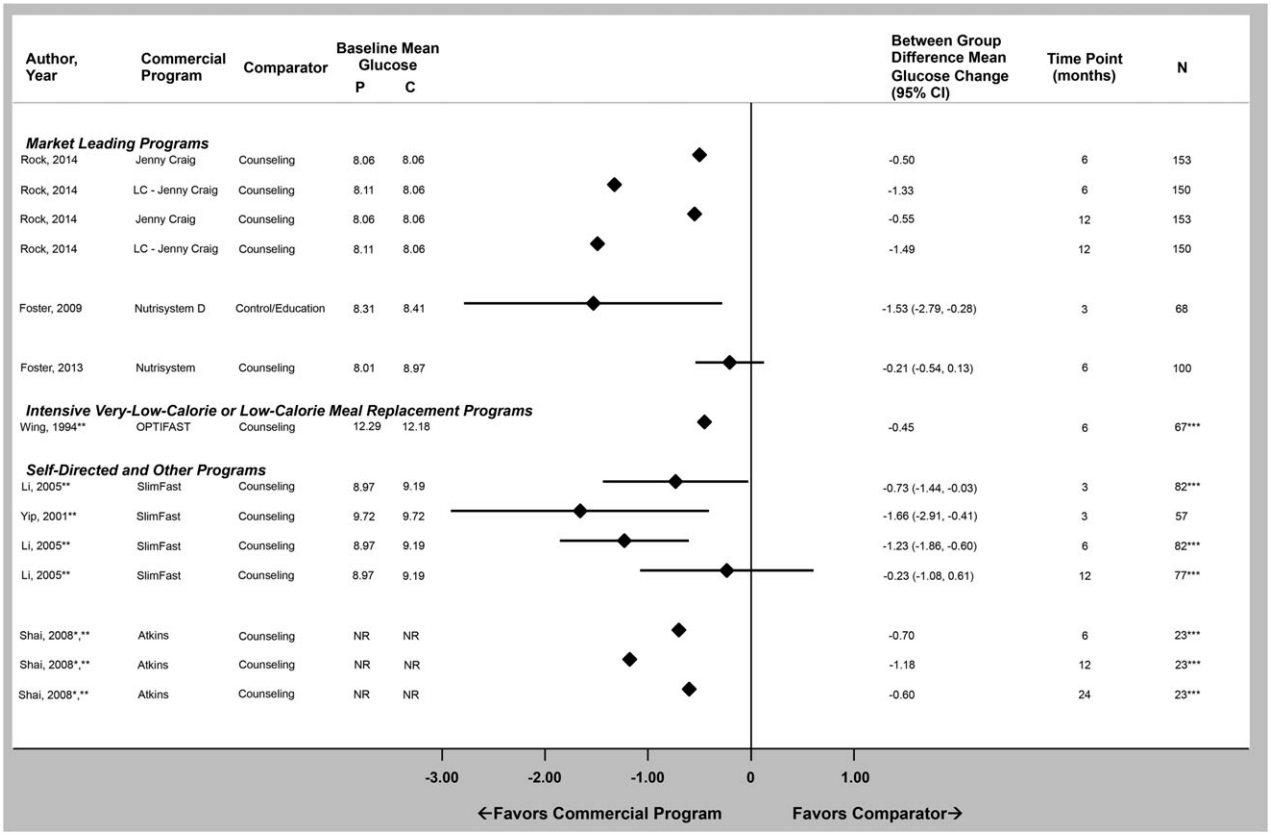

Figure 3 Difference in mean glucose change (mmol/L) between commercial programmes and comparators among overweight and obese populations with type 2 diabetes mellitus, displayed by time point. Diamond size is standardized across trials and does not reflect sample size analysed. To convert mmol/L to mg/dL, divide values by 0.05551. *Results reported in more than one article. **Results from completers' analysis only. ***Trials where reported attrition was not reported or was high (attrition ≥30% in one arm or difference in attrition between arms was ≥20%). C, comparator; NR, not reported; P, commercial programme.

6 months, HMR significantly reduced fasting glucose 0.58 mmol/L more than counselling (ROB: high) (Fig. 4).

We identified no trials of OPTIFAST in patients without T2DM who met our inclusion criteria.

Self-directed and other programmes: SlimFast, Atkins, Biggest Loser Club, and Curves

Three RCTs compared SlimFast with control/education (29,30,32–37) – two only reported completers' analyses. Results were mixed, comparing SlimFast and control with respect to fasting glucose – no consistent effects could be ascertained (Fig. 4) (ROB: high).

Four RCTs examined glycemic outcomes among Atkins participants – one compared with control/education (29,30) and three to behavioural counselling (22–24,38–40). At 12 months, no difference in mean glucose change occurred between Atkins and counselling (Fig. 4) (ROB: moderate).

One RCT evaluated The Biggest Loser Club (41–43). At 3 months, no significant difference existed in change in fasting glucose between The Biggest Loser Club and control/education (Fig. 4) (ROB: low).

One unpublished RCT evaluated Curves (44–46) as compared with control/education. Curves did not result in a significantly greater decrease in percent change in fasting glucose as compared with control/education (0.6% vs. 1.3%, respectively; $p = 0.85$) (ROB: unclear).

Discussion

For overweight/obese adults with T2DM, the 2016 American Diabetes Association guidelines recommend that these individuals lose weight through lifestyle changes (47). Modest weight loss may provide clinical benefits in some individuals with T2DM, especially those early in the disease process (48). Similarly, the Community Preventive Services Task Force has recommended the use of combined diet and physical activity counselling for overweight patients at increased risk for T2DM (49). Despite the evidence and recommendations, there are limited options in the community that offer intensive lifestyle interventions as studied in

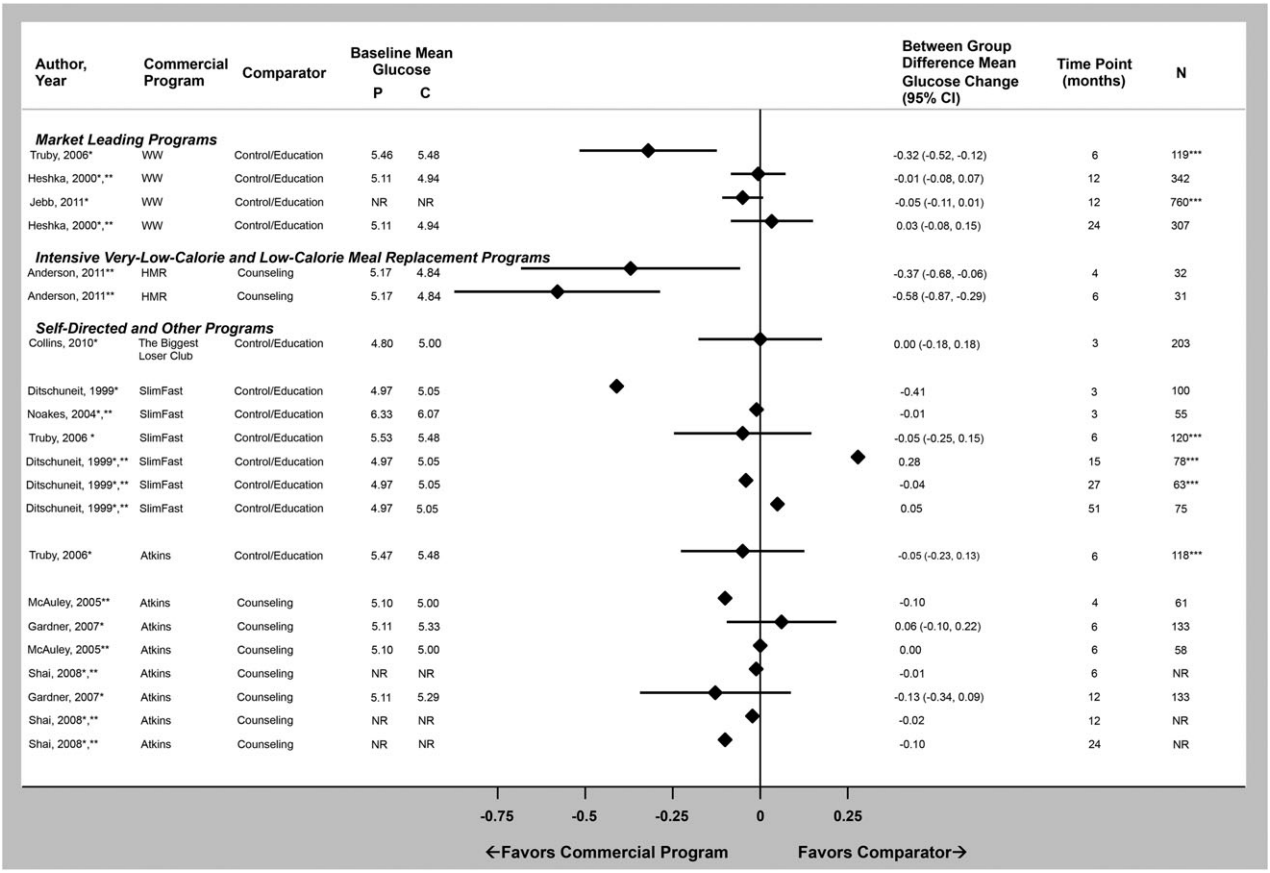

Figure 4 Difference in mean glucose change (mmol/L) between commercial programmes and comparators among overweight and obese populations without type 2 diabetes mellitus, displayed by time point. Diamond size is standardized across trials and does not reflect sample size analysed. To convert mmol/L to mg/dL, divide values by 0.05551. *Results reported in more than one article. **Results from completers' analysis only. ***Trials where reported attrition was not reported or was high (attrition ≥30% in one arm or difference in attrition between arms was ≥20%). C, comparator; HMR, health management resources; NR, not reported; P, commercial programme; WW, Weight Watchers.

DPP (16 counselling sessions and >150 min/week of physical activity) (7) or Look AHEAD (calorie restriction, meal replacement, counselling and >150 min/week of physical activity) (8). Thus, clinicians may consider commercial weight loss programmes as a substitute given their ready availability. Commercial weight loss programmes are popular and represent a multibillion dollar industry (50). This review is the first to examine the evidence regarding the efficacy of commercial weight loss programmes on glycemic outcomes among overweight and obese patients with and without T2DM.

Three programmes showed promising glycemic lowering benefits among patients with T2DM. In a single trial, Jenny Craig resulted in greater reductions in A1c at 12 months when compared with counselling. This study also reported greater reductions in diabetes medications, which suggests Jenny Craig's beneficial effects beyond changes in A1c. Other trials reporting 12-month outcomes, which examined SlimFast and Atkins, did not show significant A1c reductions. Nutrisystem and OPTIFAST showed promising short-term A1c reductions relative to comparators. Given that the goal of many patients and clinicians is sustained weight loss and glycemic improvement, additional trials that extend to 12 months or beyond are needed to confirm the findings for these programmes. We did not find eligible RCTs for any other popular commercial programmes among individuals with T2DM. Based on available evidence, Jenny Craig, Nutrisystem and OPTIFAST appear most promising among patients with T2DM, although clinicians should be aware of the moderate to high risk of bias for these trials. If considering patient referral, clinicians should also be aware that these programmes might have higher costs than Weight Watchers or self-directed programmes (10). These commercial programmes may be considered among the nutritional treatment options with evidence to support glycemic benefits, which also include Mediterranean (51) and vegan diets (52).

We also examined benefits among overweight and obese patients without T2DM. While Weight Watchers and Jenny Craig consistently led to greater reductions in weight as

compared with control/education or counselling (10), there were no long-term differences between Weight Watchers and control/education in fasting glucose, and no trials of Jenny Craig reported glycemic outcomes among patients without T2DM. When compared with control/education or counselling, one trial showed that HMR achieved a significantly greater short-term change in fasting glucose as compared with counselling. Atkins had similar effects on glucose change to counselling, and no consistent effects were seen with SlimFast relative to comparator. Little evidence exists for The Biggest Loser Club and Curves, and no evidence exists for Jenny Craig, Nutrisystem or OPTIFAST. Overall, the quality of evidence evaluating the efficacy of commercial weight loss programmes on glycemic outcomes among overweight and obese individuals without T2DM is poor, and we can draw no firm conclusions. Clinicians and patients should be aware that it is unclear whether the previously described weight loss benefits translate into reductions in fasting glucose. Additional studies are needed among overweight and obese individuals without T2DM to determine whether or not any benefits exist – including overweight/obese individuals with prediabetes as the study population would enable a better comparison with that which was enrolled in DPP. Recently, Marrero and colleagues compared a modified version of Weight Watchers to a diabetes education programme among individuals with prediabetes. While this study does not meet inclusion criteria for this review (Weight Watchers was modified), between-group difference in mean A1c change was statistically significant at 6 months. There were no statistically significant between-group differences in mean A1c change at 12 months or mean glucose change at 6 or 12 months, despite achieving a significantly greater weight loss of approximately 5% at both time points (53). The results from this study are consistent with our synthesis of the previous literature, although this trial may indicate an interest by a commercial programme to begin to target individuals with prediabetes. More trials comparing the results of a commercial programme among individuals with prediabetes would be better comparable to DPP. At this time, referral to an organisation offering the National Diabetes Prevention Program for weight loss, may be a better evidence-based option for individuals with prediabetes (54).

Reducing the costs associated with T2DM and obesity are critical. In 2012, the management of T2DM was associated with $245bn of direct and indirect costs (1), and the costs of obesity and its associated conditions were estimated to be $147bn (3). To address these rising costs, the 2010 Patient Protection and Affordable Care Act mandated the provision of diagnosis and referral of patients with obesity for weight management. While our results suggest that several commercial weight loss programmes have promising glycemic benefits for patients with T2DM (Jenny Craig, Nutrisystem and OPTIFAST), these programmes are often not covered benefits and their associated fees may be barriers for some patients. Whether more health insurers will consider expanding benefits coverage or offer incentives for participation in these programmes is unclear.

Our systematic review is limited by the paucity of long-term trials evaluating glycemic outcomes among commercial weight-loss programmes. Given the short duration of many trials, we are unable to comment on benefits with respect to reduction in incidence of T2DM among overweight and obese patients. We were not able to characterize the prevalence of other important risk factors for T2DM, like prediabetes, in the overweight/obese group without T2DM. Given that the average fasting glucose was normal for most trials among participants without T2DM, the ability to detect programmes' effect on this outcome might be diminished. The clinical significance of lowering glucose among individuals with normal range measurements is unclear, particularly when their other risk factors for T2DM are unknown. Glucose was often a secondary outcome in these trials, so the studies may also not have been adequately powered to detect significant differences in these outcomes. These factors make comparing the results from DPP to these trials among individuals without T2DM difficult. Future studies should consider including individuals with prediabetes in studies of commercial weight-loss programmes to be more comparable with DPP. In contrast, trials among individuals with T2DM had elevated A1c levels at baseline and achieved more robust decreases in fasting glucose and A1c – the results in these studies may be more readily compared with Look AHEAD. Only four RCTs reported changes in medication use among patients with T2DM, which may be a critically important outcome to patients and clinicians. Other limitations of the review have been discussed previously (10) and include the following: (i) we only included commercial weight-loss programmes available across the USA; (ii) risk of bias was high for many trials and many were funded by the programmes themselves, which may influence interpretations of intervention effect and (iii) internal validity of many trials was weak due to high attrition and less robust statistical methods (e.g. completers' only analyses as compared with intention-to-treat with baseline observation carried forward approach).

Conclusion

Among individuals with T2DM, Jenny Craig reduced A1c more than counselling at 12 months and Nutrisystem and OPTIFAST showed promising short-term A1c results. Among overweight and obese individuals without T2DM, the paucity of evidence limits our ability to draw conclusions and emphasizes the need for additional research in this area. Some commercial programmes might be considered as treatment options in addition to others like the Centers for

Disease Control-certified National Diabetes Prevention Programs. Clinicians should consider discussing individual programmes' outcomes and costs with patients to determine the best weight management plan.

Conflict of interest statement

No conflict of interest was declared.

Acknowledgements

This study had no direct funding support. RSD was supported by the Johns Hopkins medical student summer research programme and the Johns Hopkins Institute for Clinical and Translational Research (ICTR), which is funded in part by Grant Number TL1TR001078 from the National Center for Advancing Translational Sciences (NCATS). DKJ was supported by the Medical Student Research Program in Diabetes at JHU-UMD Diabetes Research Center from NIDDK (P30DK079637). SNB and KAG were supported by career development awards from the NHLBI (K01HL096409 and K23HL116601, respectively). RRK was supported by a career development award from NIDDK (DK093583). The contents of this publication are solely the responsibility of the authors and do not necessarily represent the official view of the Johns Hopkins ICTR, NCATS or NIH.

Supporting information

Additional Supporting Information may be found in the online version of this article, http://dx.doi.org/10.1111/obr.12423

Supplemental Table 1. List of Commercial of Proprietary Weight-Loss Programs Considered.
Supplemental Table 2. Study Eligibility Criteria.
Supplemental Table 3. Compendium Describing Study Characteristics, Risk of Bias, and Baseline Population Characteristics of Each Included Randomized Controlled Trial by Program and Comparator.

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