SUPPLEMENTARY DATA

Supplementary Table 1. Search strategy to identify randomized controlled trials investigating the effect of liquid meal replacements on cardiometabolic risk factors in overweight/obese individuals with type 2 diabetes

MEDLINE through December 10, 2018	EMBASE through December 10, 2018	Cochrane Central Register of Controlled Trials through December 10, 2018
1. (meal* adj3 replace*).mp.	1. (meal* adj3 replace*).mp.	1. (meal* adj3 replace*).ti,ab,hw.
2. (breakfast adj3 replace*).mp.	2. (breakfast adj3 replace*).mp.	2. (breakfast adj3 replace*).ti,ab,hw.
3. (lunch adj3 replace*).mp.	3. (lunch adj3 replace*).mp.	3. (lunch adj3 replace*).ti,ab,hw.
4. (dinner adj3 replace*).mp.	4. (dinner adj3 replace*).mp.	4. (dinner adj3 replace*).ti,ab,hw.
5. liquid supplement*.mp.	5. liquid supplement*.mp.	5. liquid supplement*.ti,ab,hw.
6. (formula adj2 diet*).mp.	6. (formula adj2 diet*).mp.	6. (formula adj2 diet*).ti,ab,hw.
7. or /1- 6	7. or/ 1-6	7. or/ 1- 6
8. ogtt.mp.	8. ogtt.mp.	8. ogtt.ti,ab,hw.
9. hba1c.mp.	9. hba1c.mp.	9. hba1c.ti,ab,hw.
10. insulin*.mp.	10. insulin*.mp.	10. insulin*.ti,ab,hw.
11. glycemia.mp.	11. glycemia.mp.	11. glycemia.ti,ab,hw.
12. hyperinsulin*.mp.	12. hyperinsulin*.mp.	12. hyperinsulin*.ti,ab,hw.
13. dysglycemia.mp.	13. dysglycemia.mp.	13. dysglycemia.ti,ab,hw.
14. exp Hemoglobin A, Glycosylated/	14. exp hemoglobin A1c/	14. exp Hemoglobin A, Glycosylated/
15. exp Blood Glucose/	15. exp glucose blood level/	15. exp Blood Glucose/
16. exp Hyperglycemia/	16. exp hyperglycemia/	16. exp Hyperglycemia/
17. or/ 8-16	17. or/8-16	17. or/ 8-16
18. ldl.mp.	18. ldl.mp.	18. ldl.ti,ab,hw.
19. hdl.mp.	19. hdl.mp.	19. hdl.ti,ab,hw.
20. apo B.mp.	20. apo B.mp.	20. apo B.ti,ab,hw.
21. non hdl c.mp.	21. non hdl c.mp.	21. non hdl c.ti,ab,hw.
22. triglycerides.mp.	22. triglycerides.mp.	22. triglycerides.ti,ab,hw.
23. TG.mp.	23. TG.mp.	23. TG.ti,ab,hw.
24. triacylglycerol*.mp.	24. triacyglycerol*.mp.	24. triacylglycerol.ti,ab,hw.
25. TAG.mp.	25. TAG.mp.	25. TAG.ti,ab,hw.
26. hypertriglyceridemia.mp.	26. hypertriglyceridemia.mp.	26. hypertriglyceridemia.ti,ab,hw.
27. exp Cholesterol, LDL/	27. exp low density lipoprotein cholesterol/	27. exp Cholesterol, LDL/
28. exp Cholesterol, HDL/	28. exp high density lipoprotein cholesterol/	28. exp Cholesterol, HDL/
29. exp Apolipoproteins B/	29. exp apolipoprotein B/	29. exp Apolipoproteins B/
30. exp Triglycerides/	30. exp triacylglycerol/	30. exp Triglycerides/
31. exp Hypertriglyceridemia/	31. exp hypertriglyceridemia/	31. exp Hypertriglyceridemia/
32. exp Dyslpidemias/	32. exp dyslipidemia/	32. exp Dyslipidemias/
33. or/18- 32	33. or/ 18-32	33. or/ 18-32
34. systolic blood pressure.mp.	34. systolic blood pressure.mp.	34. systolic blood pressure.ti,ab,hw.
35. diastolic blood pressure.mp.	35. diastolic blood pressure.mp.	35. diastolic blood pressure.ti,ab,hw.
36. hypertension.mp.	36. hypertension.mp.	36. hypertension.ti,ab,hw.
37. SBP.mp.	37. SBP.mp.	37. SBP.ti,ab,hw.
38. DBP.mp.	38. DBP.mp.	38. DBP.ti,ab,hw.
39. exp Hypertension/	39. exp hypertension/	39. exp Hypertension/
40. exp Blood Pressure/	40. exp blood pressure/	40. exp Blood Pressure/
41. or/ 34- 40	41. or/34- 40	41. or/34- 40
42. waist circumference.mp.	42. waist circumference.mp.	42. waist circumference.ti,ab,hw.
43. body weight.mp.	43. body weight.mp.	43. body weight.ti,ab,hw.
44. body fat.mp.	44. body fat.mp.	44. body fat.ti,ab,hw.
45. body mass index.mp.	45. body mass index.mp.	45. body mass index.ti,ab,hw.
46. BMI.mp.	46. BMI.mp.	46. BMI.ti,ab,hw.
47. metabolic syndrome.mp.	47. metabolic syndrome.mp.	47. metabolic syndrome.ti,ab,hw.
48. exp Abdominal Fat/	48. exp abdominal fat/	48. exp Abdominal Fat/
49. exp Body Weight/	49. exp body weight/	49. exp Body Weight/
50. exp Body Mass Index/	50. exp body mass/	50. exp Body Mass Index/
51. or/ 42-50	51. or/ 42-50	51. or/ 42-50
52. exp Obesity/	52. exp obesity/	52. exp Obesity/
53. exp Diabetes Mellitus, Type 2/	53. exp diabetes mellitus/	53. exp Diabetes Mellitus, Type 2/
54. exp Metabolic Syndrome X/	54. exp metabolic syndrome X/	54. exp Metabolic Syndrome X/
55. or/ 52-54	55. or/ 52-54	55. 52 or 53 or 54
56. 7 and (17 or 33 or 51 or 55)	56. 7 and (17 or 33 or 41 or 51 or 55)	56. 7 and (17 or 33 or 41 or 51 or 55)
57. limit 56 to animals	57. limit 56 to animals	
58. 56 not 57	58. 56 not 57	

Original search date: September 12, 2016
Updates: August 15, 2017; January 22, 2018; March 22, 2018; May 31, 2018; December 10, 2018

SUPPLEMENTARY DATA

Supplementary Table 2. Trial characteristics

Study, Year [Reference]	Participants	Age, years	BMI, kg/m^2	HbA$_{1c}$, %	Diabetes duration, years	Setting	Design	Diet Description	Diet breakdown (%C: %F: %P)	Dose (%E)	Additional treatment characteristics	Dropout Rate, %	Follow-up duration	Funding source
Yip et al., 2001 [19]						OP, USA	P						12 weeks	A & I
Intervention	41 OB + DM2	58.8 ± 8.7	32.6 ± 4.1	8.7 ± 1.3	NR			2 to 3 main meals replaced with MR shakes (sugar-containing and sugar-free) + portion-controlled dinner high in fruits and vegetables	500 kcal/d deficit	~29	Individual consultation with registered dietitian at various timepoints throughout study	18		
Control	16 OB + DM2	59.2 ± 7.7	33.8 ± 4.8	9.3 ± 1.5	NR			ADA-based individualized food exchange diet plan	500 kcal/d deficit (55-65: <30: 10-20)		Individual consultation with registered dietitian at various timepoints throughout study	36		
Li et al., 2005 [20]						OP, USA	P						52 weeks	I
Intervention	46 OB + DM2 (27M, 19F)	54.4 ± 9.3	32.8 ± 3.7	7.6 ± 1.4	NR			1 to 2 main meals were replaced with MR shakes + fruits and vegetables + 1 to 2 sensible meals	500 kcal/d deficit	~11-23		19		
Control	36 OB + DM2 (24M, 12F)	56.6 ± 10.4	33.7 ± 3.6	7.5 ± 1.7	NR			ADA-based food exchanges	500 kcal/d deficit (55-65: <30: 10-20)			33		
Cheskin et al., 2008 [21]						OP, USA	P			~20			34 weeks	I
Intervention	54 OW/OB + DM2 (25M, 29F)	54.6 ± 7.0	35.3 ± 3.5	7.7 ± 0.2	NR			50-60%E came from MR shakes, soups, and bars	25% energy deficit (45-50: 25-30: 15-25)		Attended group educational classes on nutrition, exercise and diabetes	43		
Control	58 OW/OB + DM2 (24M. 34F)	55.5 ± 7.2	35.7 ± 3.8	7.1 ± 0.2	NR			ADA-based food exchange lists	25% energy deficit (45-50: 25-30: 15-25)		Attended group educational classes on nutrition, exercise and diabetes	71		
Sun et al., 2008 [22]						OP, China	P						24 weeks	I
Intervention	100 OW + DM2 (74M, 26F)	51.0 ± 10.0	26.6 ± 3.0	7.1 ± 1.0	4.0 ± 3.0			Replaced breakfast with MR shake	~1600 kcal/d	~13	Received blood glucose monitors and group diabetes education	3		
Control	50 OW + DM2 (34M, 16F)	51.0 ± 7.0	27.2 ± 2.1	7.0 ± 1.4	4.0 ± 2.8			ADA- and CDA-based exchange diet plan	~1600 kcal/d		Received diabetes education including diet and physical activity instruction	2		
Keogh & Clifton, 2012 [23]						OP, Australia	P						24 weeks	NR
Intervention	43 OW/OB (27M, 16F)	61.7	33.7	6.8	NR			2 main meals were replaced with MR shakes + low fat evening meal + at least 5 servings of fruit and vegetables	~1200 kcal/d	~35		28		
Control	38 OW/OB (23M, 15F)				NR			CSIRO Total Wellbeing Diet book				31		
Shirai et al., 2013 [24]						OP, Japan	P						24 weeks	A
Intervention	119 OW/OB + DM2 (45M, 74F)	50.5 ± 11.8	30.8 ± 5.8	7.7 ± 1.4	NR			Breakfast was replaced with LMR + 2 conventional Japanese low-caloric meals	20 kcal/kg x standard body weight (52:30:18)	~15		1		
Control	110 OW/OB + DM2 (40M, 70F)	51.7 ± 10.9	30.0 ± 4.6	7.7 ± 1.3	NR			Classical Japanese low-caloric meals 3 times per day	20 kcal/kg x standard body weight (60:25:15)			8		

SUPPLEMENTARY DATA

Study, Year [Reference]	Participants	Age, years	BMI, kg/m^2	HbA$_{1c}$, %	Diabetes duration, years	Setting	Design	Diet Description	Diet breakdown (C: F: P)	Dose (%E)	Additional treatment characteristics	Dropout Rate, %	Follow-up, wks	Funding
Stenvers et al., 2014 [25]						OP, Netherlands	C						12 weeks	I
Intervention	20 OW/OB + DM2 (10M, 10F)	60.0 ± 7.0	Median (25^{th}-75^{th} percentile), 30 (27-35)	Median (25^{th} – 75^{th} percentile), 6.5 (6.1-6.8)	Median (25^{th} – 75^{th} percentile), 5 (1-9)			Breakfast was replaced with MR shake + self-selected conventional foods	41: 32: 33 (1659 kcal/d)	~18%		16		
Control								Free-choice control breakfast + self-selected conventional foods	43: 27: 30 (1737 kcal/d)			20		
Chee et al., 2017 [26]						OP, Malaysia	P						24 weeks	I
Intervention 1 (tDNA-MI)	58 OW/OB + DM2 (19M, 39F)	55.0 ± 8.0 (median ± IQR)	30.7 ± 8.2 (median ± IQR)	7.7 ± 1.1 (median ± IQR)	NR			1 to 2 main meals replaced with MR shakes + self-selected conventional low-calorie foods	1200 or 1500 kcal/d	~31-63	Received counselling incorporating motivational interviewing + prescription of 150 mins/wk of physical activity	12		
Intervention 2 (tDNA-CC)	57 OW/OB + DM2 (7M, 50F)	55.0 ± 8.0 (median ± IQR)	29.4 ± 7.3 (median ± IQR)	7.7 ± 1.4 (median ± IQR)	NR			1 to 2 main meals replaced with MR shakes + self-selected conventional low-calorie foods	1200 or 1500 kcal/d	~31-63	Received counselling incorporating conventional techniques (i.e. empathetic listening, encouragement) + prescription of 150 mins/wk of physical activity	30		
Control (UC)	105 OW/OB + DM2 (59M, 56F)	54.0 ± 8.0 (median ± IQR)	28.9 ± 6.3 (median ± IQR)	7.9 ± 1.3 (median ± IQR)	NR			Low-calorie diet of self-selected conventional foods based on the Malaysian Clinical Practice Guidelines	1200 or 1500 kcal/d		Followed Malaysian Clinical Practice Guidelines for DM2 (includes recommendation of 150 mins/wk of physical activity) with standard diabetes support and lifestyle education	15		

Date represents mean ± SD, unless stated otherwise. tDNA, trans-cultural diabetes-specific nutrition algorithm; MI, motivational interviewing; CC, conventional counselling; UC, usual care; OW, overweight; OB, obese; DM2, type 2 diabetes; M, male; F, female; NR, not reported; OP, outpatient; P, parallel; C, crossover; MR, meal replacement; LMR, liquid meal replacement; ADA, American Diabetes Association; CDA, Chinese Diabetes Association; CSIRO, Commonwealth Scientific and Industrial Research Organization; C: F: P, carbohydrates: fat: protein; kcal/d, calories per day; %E, % of total daily caloric intake; A, agency; I, industry;

SUPPLEMENTARY DATA

Supplementary Table 3. Select sensitivity analyses in which the systematic removal of an individual trial altered the significance of the effect estimate or the evidence for heterogeneity

Removal of	Intervention, N	Control, N	Pooled effect estimate			Heterogeneity	
			MD	95% CI	P-value	I^2	P_Q
Body fat, %							
Chee et al. 2017 – CC vs. UC	57	57	-1.49	[-2.16, -0.83]	<0.001	63%	0.07
Chee et al. 2017 – MI vs. UC	58	58	-1.61	[-2.37, -0.84]	<0.001	67%	0.05
Waist circumference, cm							
Sun et al. 2008	100	50	-1.79	[-3.57, -0.01]	0.05	69%	0.02
Chee et al. 2017 – MI vs. UC	58	58	-1.87	[-3.74, 0.00]	0.05	79%	0.002
Stenvers et al. 2014	20	20	-3.17	[-3.87, -2.46]	<0.001	0%	0.43
Fasting insulin, pmol/L							
Li et al. 2005	46	36	-12.01	[-25.35, 1.32]	0.08	37%	0.18
Sun et al. 2008	100	50	-10.06	[-22.99, 2.86]	0.13	32%	0.21
Cheskin et al. 2008	31	17	-8.16	[-19.18, 2.87]	0.15	0%	0.43
Shirai et al. 2013	119	110	-10.21	[-24.81, 4.39]	0.17	35%	0.19
LDL-c, mmol/L							
Li et al. 2005	46	36	0.06	[-0.03, 0.15]	0.18	37%	0.14
HDL-c, mmol/L							
Sun et al. 2008	100	50	0.02	[-0.02, 0.05]	0.42	47%	0.07
Triglycerides, mmol/L							
Stenvers et al. 2014	20	20	-0.08	[-0.20, 0.04]	0.17	37%	0.13
Systolic blood pressure, mmHg							
Keogh & Clifton, 2012	41	36	-6.03	[-7.63, -4.43]	<0.001	0%	0.61

MD, mean difference; CC, conventional counselling; MI, motivational interviewing; UC, usual care.

SUPPLEMENTARY DATA

Supplementary Table 4. Sensitivity analyses of pooled effect estimates in which trials of <24 weeks in duration were removed

Outcome	Pooled effect estimate of all included trials		Pooled effect estimates after removal of trials <24 weeks in duration		% change in pooled effect estimate
	Mean difference [95% CI]	P-value	Mean difference [95% CI]	P-value	
Body weight, kg	-2.37 [-3.30, -1.44]	<0.001	-2.74 [-3.87, -1.62]	<0.001	-16%
BMI, kg/m^2	-0.87 [-1.31, -0.42]	<0.001	-1.12 [-1.68, -0.57]	<0.001	-29%
Body fat, %	-1.66 [-2.17, -1.15]	<0.001	-1.72 [-2.24, -1.21]	<0.001	-4%
Waist circumference, cm	-2.24 [-3.72, -0.77]	0.003	-3.17 [-3.87, -2.46]	<0.001	-42%
HbA_{1c}, %	-0.43 [-0.66, -0.19]	<0.001	-0.52 [-0.78, -0.26]	<0.001	-21%
Fasting glucose, mmol/l	-0.63 [-0.99, -0.27]	<0.001	-0.56 [-0.94, -0.17]	0.005	+11%
Fasting insulin, pmol/l	-11.83 [-23.11, -0.54]	0.04	-19.41 [-31.13, -7.69]	0.001	-64%
LDL-c, mmol/l	0.02 [-0.10, 0.14]	0.78	0.03 [-0.12, 0.17]	0.72	-50%
HDL-c, mmol/l	0.00 [-0.05, 0.04]	0.93	-0.01 [-0.06, 0.05]	0.73	-100%
Non-HDL-c, mmol/l	-0.02 [-0.11, 0.07]	0.69	-0.01 [-0.12, 0.10]	0.83	+50%
Triglycerides, mmol/l	-0.01 [-0.17, 0.14]	0.86	-0.07 [-0.22, 0.07]	0.33	-600%
Systolic blood pressure, mmHg	-4.97 [-7.32, -2.62]	<0.001	-5.00 [-7.53, -2.48]	<0.001	-1%
Diastolic blood pressure, mmHg	-1.98 [-3.05, -0.91]	<0.001	-2.09 [-3.28, -0.89]	<0.001	-6%

SUPPLEMENTARY DATA

Supplementary Table 5. Sensitivity analyses of heterogeneity in which trials of <24 weeks in duration were removed

Outcome	Heterogeneity of all included trials		Heterogeneity after removal of trials <24 weeks in duration	
	I^2	P_Q	I^2	P_Q
Body weight, kg	84%	<0.001	87%	<0.001
BMI, kg/m^2	89%	<0.001	91%	<0.001
Body fat, %	50%	0.11	23%	0.27
Waist circumference, cm	74%	0.004	0%	0.43
HbA_{1c}, %	87%	<0.001	88%	<0.001
Fasting glucose, mmol/l	70%	<0.001	64%	0.01
Fasting insulin, pmol/l	22%	0.27	0%	0.74
LDL-c, mmol/l	68%	0.001	75%	<0.001
HDL-c, mmol/l	71%	<0.001	78%	<0.001
Non-HDL-c, mmol/l	29%	0.19	46%	0.08
Triglycerides, mmol/l	68%	0.002	46%	0.09
Systolic blood pressure, mmHg	53%	0.05	61%	0.03
Diastolic blood pressure, mmHg	15%	0.32	27%	0.24

SUPPLEMENTARY DATA

Supplementary Table 6. Sensitivity analyses of pooled effect estimates in which trials using non-diabetes-specific liquid meal replacements were removed

Outcome	Pooled effect estimate of all included trials		Pooled effect estimates after removal of trials using non-diabetes-specific liquid meal replacements		% change in pooled effect estimate
	Mean difference [95% CI]	P-value	Mean difference [95% CI]	P-value	
Body weight, kg	-2.37 [-3.30, -1.44]	<0.001	-2.97 [-4.88, -1.05]	0.002	-25%
BMI, kg/m^2	-0.87 [-1.31, -0.42]	<0.001	-1.10 [-1.90, -0.30]	0.007	-26%
Body fat, %	-1.66 [-2.17, -1.15]	<0.001	NA	NA	NA
Waist circumference, cm	-2.24 [-3.72, -0.77]	0.003	NA	NA	NA
HbA_{1c}, %	-0.43 [-0.66, -0.19]	<0.001	-0.53 [-0.92, -0.14]	0.007	-23%
Fasting glucose, mmol/l	-0.63 [-0.99, -0.27]	<0.001	-0.76 [-1.15, -0.37]	<0.001	-21%
Fasting insulin, pmol/l	-11.83 [-23.11, -0.54]	0.04	-14.82 [-37.48, 7.83]	0.20	-25%
LDL-c, mmol/l	0.02 [-0.10, 0.14]	0.78	0.07 [-0.06, 0.20]	0.28	+250%
HDL-c, mmol/l	0.00 [-0.05, 0.04]	0.93	-0.04 [-0.08, 0.00]	0.06	-400%
Non-HDL-c, mmol/l	-0.02 [-0.11, 0.07]	0.69	0.05 [-0.05, 0.16]	0.33	+350%
Triglycerides, mmol/l	-0.01 [-0.17, 0.14]	0.86	0.05 [-0.20, 0.31]	0.68	+600%
Systolic blood pressure, mmHg	-4.97 [-7.32, -2.62]	<0.001	-6.57 [-8.49, -4.65]	<0.001	-32%
Diastolic blood pressure, mmHg	-1.98 [-3.05, -0.91]	<0.001	-2.60 [-3.85, -1.35]	<0.001	-31%

SUPPLEMENTARY DATA

Supplementary Table 7. Sensitivity analyses of heterogeneity in which trials using non-diabetes-specific liquid meal replacements were removed

Outcome	Heterogeneity of all included trials		Heterogeneity after removal of trials using non-diabetes-specific liquid meal replacements	
	I^2	P_Q	I^2	P_Q
Body weight, kg	84%	<0.001	91%	<0.001
BMI, kg/m^2	89%	<0.001	93%	<0.001
Body fat, %	50%	0.11	NA	NA
Waist circumference, cm	74%	0.004	NA	NA
HbA_{1c}, %	87%	<0.001	91%	<0.001
Fasting glucose, mmol/l	70%	<0.001	51%	0.09
Fasting insulin, pmol/l	22%	0.27	54%	0.11
LDL-c, mmol/l	68%	0.001	56%	0.06
HDL-c, mmol/l	71%	<0.001	37%	0.18
Non-HDL-c, mmol/l	29%	0.19	0%	0.92
Triglycerides, mmol/l	68%	0.002	72%	0.006
Systolic blood pressure, mmHg	53%	0.05	0%	0.62
Diastolic blood pressure, mmHg	15%	0.32	3%	0.39

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Supplementary Table 8. GRADE certainty of evidence assessment

		Certainty assessment*						Effect	Certainty
Outcome	**№ of studies**	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations****	**MD [95% CI]*****	
Body weight, kg	9	randomised trials	not serious	**serious** [a]	not serious	not serious	none	-2.37 [-3.30, -1.44]	⊕⊕⊕◯ **MODERATE**
BMI, kg/m^2	8	randomised trials	not serious	**serious** [b]	not serious	not serious	none	-0.87 [-1.31, -0.42]	⊕⊕⊕◯ **MODERATE**
Body fat, %	4	randomised trials	not serious	not serious	not serious	**serious** [c]	none	-1.66 [-2.17, -1.15]	⊕⊕⊕◯ **MODERATE**
WC, cm	5	randomised trials	not serious	**serious** [d]	not serious	**serious** [e]	none	-2.24 [-3.72, -0.77]	⊕⊕◯◯ **LOW**
HbA_{1c}, %	9	randomised trials	not serious	**serious** [f]	not serious	**serious** [g]	none	-0.43 [-0.66, -0.19]	⊕⊕◯◯ **LOW**
FG, mmol/l	9	randomised trials	not serious	**serious** [h]	not serious	**serious** [i]	none	-0.63 [-0.99, -0.27]	⊕⊕◯◯ **LOW**
FI, pmol/l	9	randomised trials	not serious	not serious	not serious	**serious** [j]	none	-11.83 [-23.11, -0.54]	⊕⊕⊕◯ **MODERATE**
LDL-c, mmol/l	9	randomised trials	not serious	**serious** [k]	not serious	**serious** [l]	none	0.02 [-0.10, 0.14]	⊕⊕◯◯ **LOW**

SUPPLEMENTARY DATA

		Certainty assessment*						Effect	Certainty
Outcome	**№ of studies**	**Study design**	**Risk of bias**	**Inconsistency**	**Indirectness**	**Imprecision**	**Other considerations****	**MD [95% CI]*****	
HDL-c, mmol/l	9	randomised trials	not serious	**serious [m]**	not serious	**serious [n]**	none	0.00 [-0.05, 0.04]	⊕⊕◯◯ **LOW**
Non-HDL-c, mmol/l	9	randomised trials	not serious	not serious	not serious	**serious [o]**	none	-0.02 [-0.11, 0.07]	⊕⊕⊕◯ **MODERATE**
TG, mmol/l	9	randomised trials	not serious	**serious [p]**	not serious	**serious [q]**	none	-0.01 [-0.17, 0.14]	⊕⊕◯◯ **LOW**
SBP, mmHg	7	randomised trials	not serious	**serious [r]**	not serious	not serious	none	-4.97 [-7.32, -2.62]	⊕⊕⊕◯ **MODERATE**
DBP, mmHg	7	randomised trials	not serious	not serious	not serious	**serious [s]**	none	-1.98 [-3.05, -0.91]	⊕⊕⊕◯ **MODERATE**

BMI, body mass index; WC, waist circumference; FG, fasting glucose; FI, fasting insulin; TG, triglycerides; SBP, systolic blood pressure; DBP, diastolic blood pressure; MD, mean difference

*Since all included studies were randomized controlled trials, the certainty of the evidence was graded as high for all outcomes by default and then downgraded based on pre-specified criteria. Risk of bias – downgraded if the majority of studies were considered to be at high risk of bias. Inconsistency – downgraded if there was substantial unexplained heterogeneity (I^2>50%, P_Q<0.1) that was unexplained by any *apriori* sensitivity or subgroup analyses. Indirectness – downgraded if there were factors present relating to the participants, interventions, or outcomes that limited the generalizability of the results. Imprecision – downgraded if the 95% confidence interval (95% CI) crossed the minimally important difference (MID) for benefit or harm. MIDs used for each outcome were: 0.5 kg for body weight, 0.2 kg/m^2 for BMI, 2% for body fat, 2 cm for waist circumference, 0.3% for HbA_{1c}, 0.5 mmol/l for fasting glucose, 5 pmol/l for fasting insulin, 0.1 mmol/l for all blood lipids and 2 mmHg for systolic and diastolic blood pressure.

**Not able to assess publication bias for any of the outcomes as <10 trials were available

***Random-effects model was used to pool data for body weight, BMI, waist circumference, HbA_{1c}, fasting glucose, fasting insulin, LDL-c, HDL-c, non-HDL-c, TG, SBP and DBP. Fixed-effects model was used to pool data for body fat.

[a] Serious inconsistency for the effect of liquid meal replacements on body weight, as I^2=84%, P_Q<0.001

[b] Serious inconsistency for the effect of liquid meal replacements on BMI, as I^2=89%, P_Q<0.001

[c] Serious imprecision for the effect of liquid meal replacements on body fat, as the 95% CIs (-2.17% to -1.15%) overlap the minimally important difference for clinical benefit (2%)

[d] Serious inconsistency for the effect of liquid meal replacements on waist circumference, as I^2=74%, P_Q=0.004

[e] Serious imprecision for the effect of liquid meal replacements on waist circumference, as the 95% CIs (-3.72 cm to -0.77 cm) overlap the minimally important difference for clinical benefit (2 cm)

[f] Serious inconsistency for the effect of liquid meal replacements on HbA_{1c}, as I^2=87%, P_Q<0.001

[g] Serious imprecision for the effect of liquid meal replacements on HbA_{1c}, as the 95% CIs (-0.66% to -0.19%) overlap the minimally important difference for clinical benefit (0.3%)

[h] Serious inconsistency for the effect of liquid meal replacements on fasting glucose, as I^2=70%, P_Q<0.001

[i] Serious imprecision for the effect of liquid meal replacements on fasting glucose, as the 95% CIs (-0.99 mmol/l to -0.27 mmol/l) overlap the minimally important difference for clinical benefit (0.5 mmol/l)

[j] Serious imprecision for the effect of liquid meal replacements on fasting insulin, as the 95% CIs (-23.11 pmol/l to -0.54 pmol/l) overlap the minimally important difference for clinical benefit (5 pmol/l)

[k] Serious inconsistency for the effect of liquid meal replacements on LDL-c, as I^2=68%, P_Q=0.001

[l] Serious imprecision for the effect of liquid meal replacements on LDL-c, as the 95% CIs (-0.10 mmol/l to 0.14 mmol/l) overlap the minimally important difference for clinical benefit (0.1 mmol/l)

[m] Serious inconsistency for the effect of liquid meal replacements on HDL-c, as I^2=71%, P_Q<0.001

[n] Serious imprecision for the effect of liquid meal replacements on HDL-c, as the 95% CIs (-0.05 mmol/l to 0.04 mmol/l) fall below the minimally important difference for clinical benefit (0.1 mmol/l)

[o] Serious imprecision for the effect of liquid meal replacements on non-HDL-c, as the 95% CIs (-0.11 mmol/l to 0.07 mmol/l) overlap the minimally important difference for clinical benefit (0.1 mmol/l)

[p] Serious inconsistency for the effect of liquid meal replacements on triglycerides, I^2=68%, P=0.002

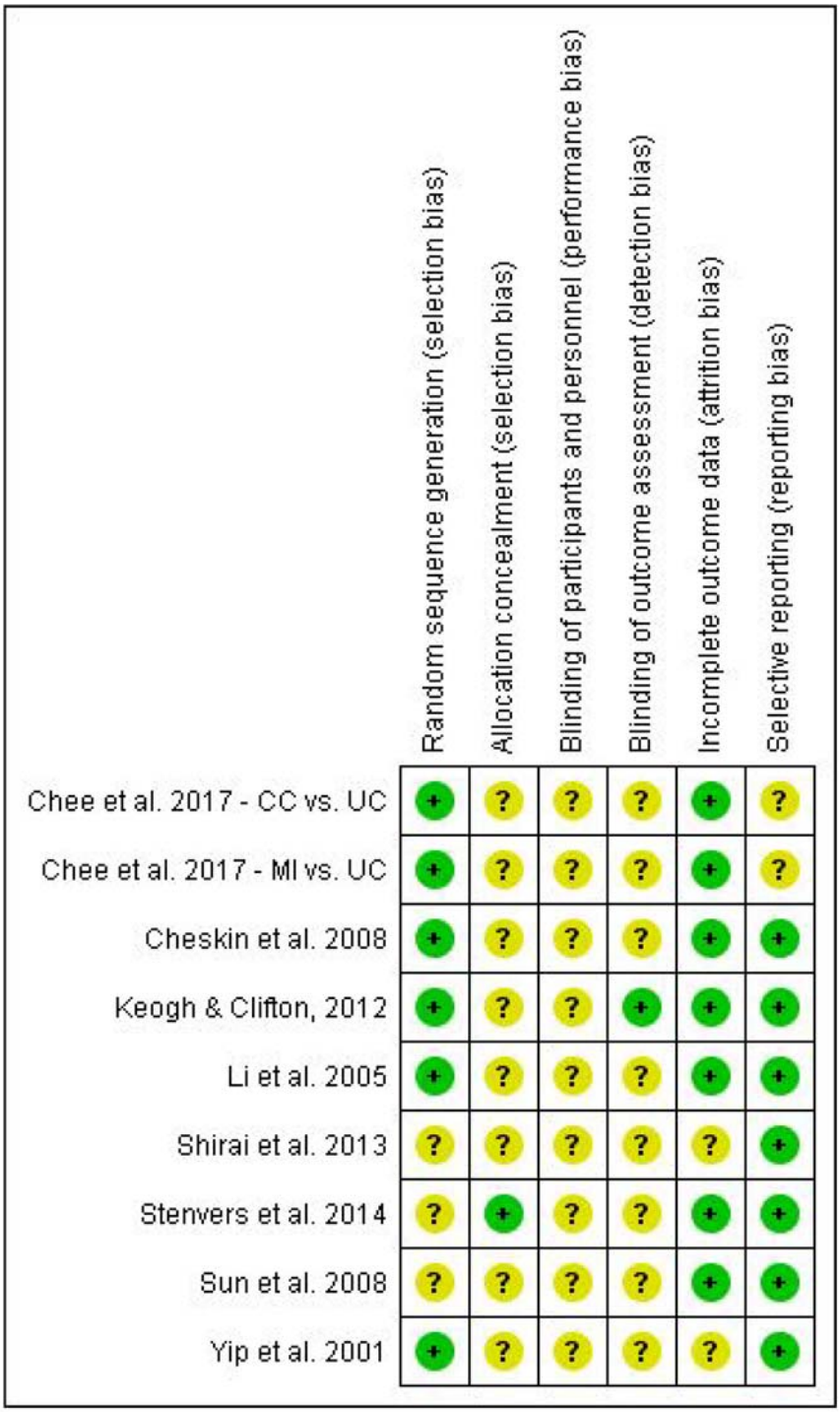
[q] Serious imprecision for the effect of liquid meal replacements on triglycerides, as the 95% CIs (-0.17 mmol/l to 0.14 mmol/l) overlap the minimally important difference for clinical benefit (0.1 mmol/l)

[r] Serious inconsistency for the effect of liquid meal replacements on systolic blood pressure, I^2=53%, P=0.05

[s] Serious imprecision for the effect of liquid meal replacements on diastolic blood pressure, as the 95% CIs (-3.05 mmHg to -0.91 mmHg) overlap the minimally important difference for clinical benefit (2 mmHg)

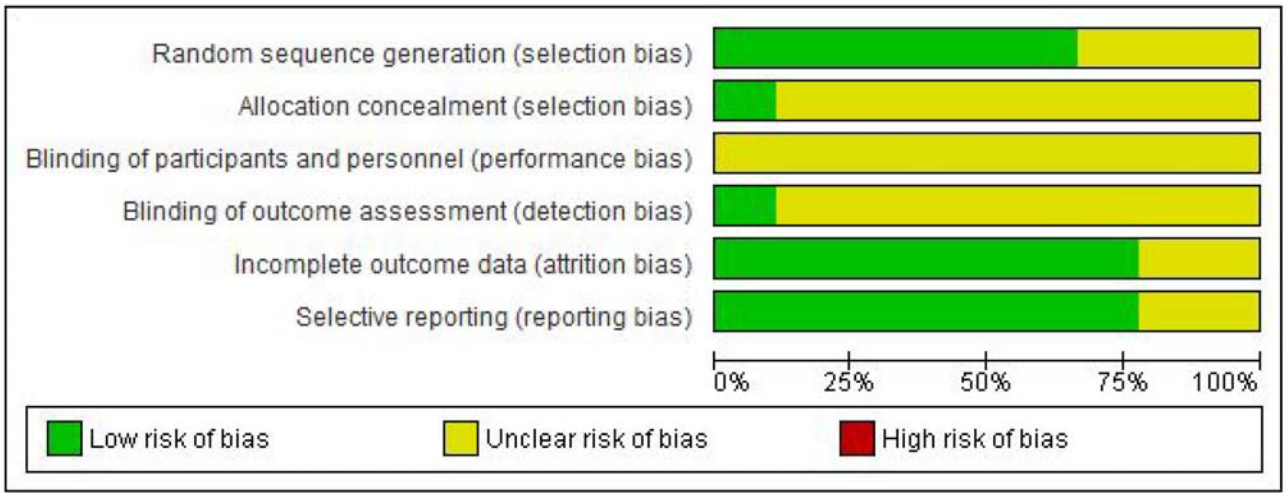
SUPPLEMENTARY DATA

Supplemental Figure 1. Cochrane risk of bias summary for all included trials



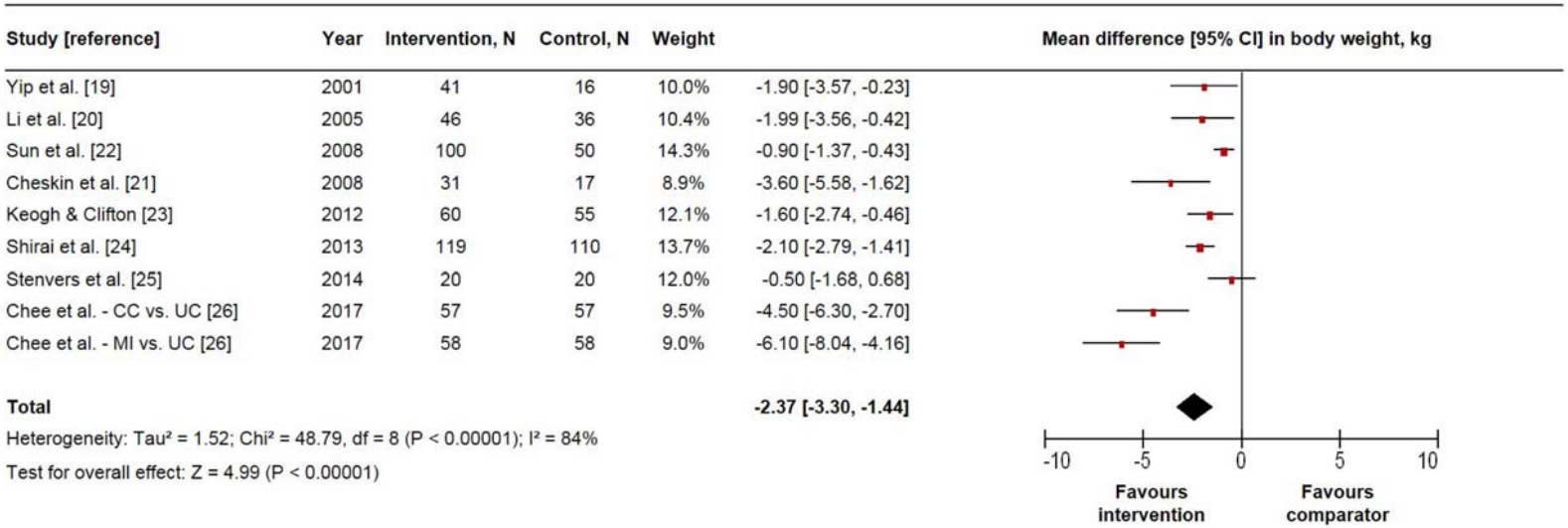
SUPPLEMENTARY DATA

Supplemental Figure 2. Risk of bias proportion for all included trials



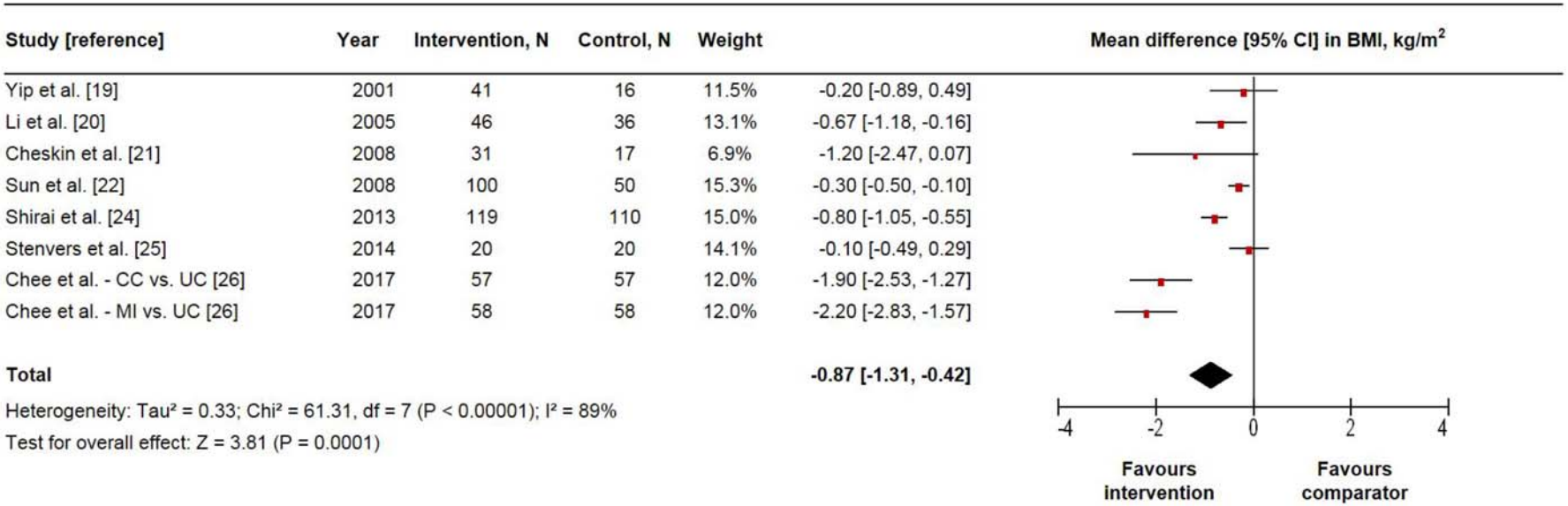
SUPPLEMENTARY DATA

Supplementary Figure 3. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on body weight. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



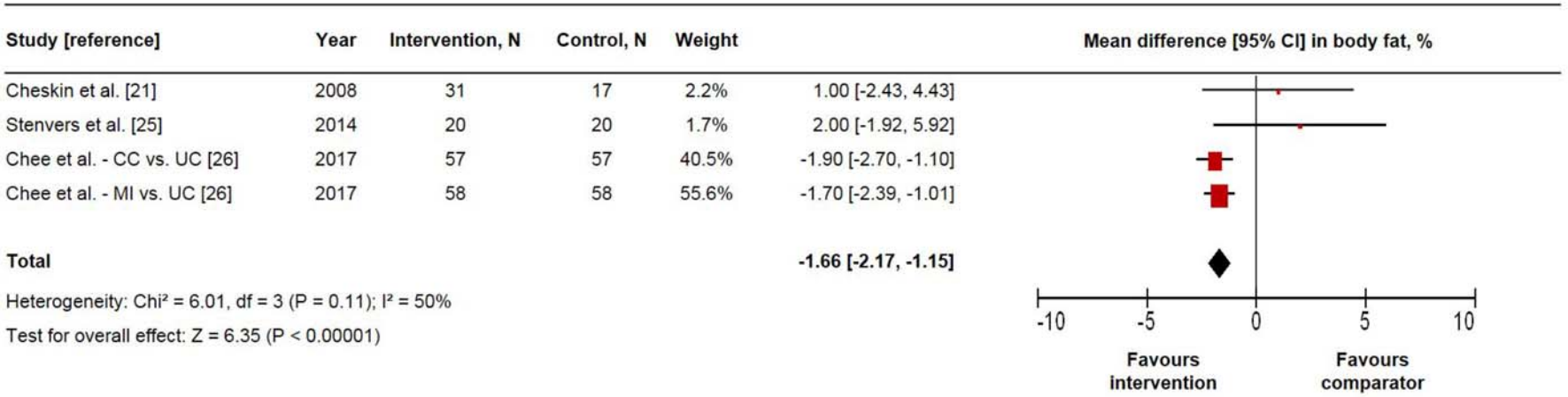
SUPPLEMENTARY DATA

Supplementary Figure 4. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on BMI. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



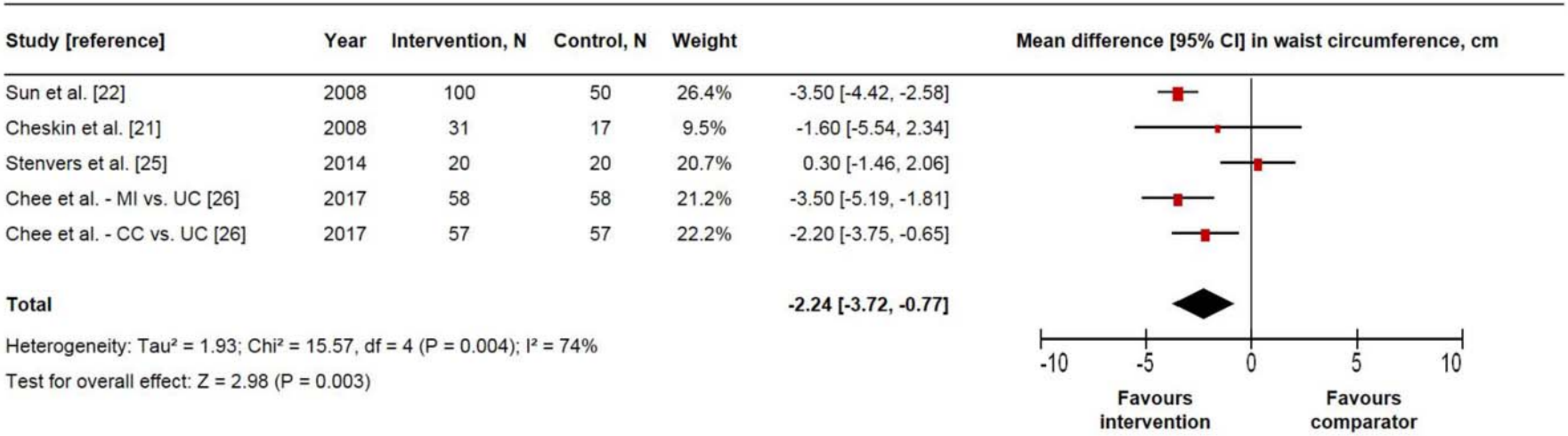
SUPPLEMENTARY DATA

Supplementary Figure 5. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on body fat. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with fixed-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



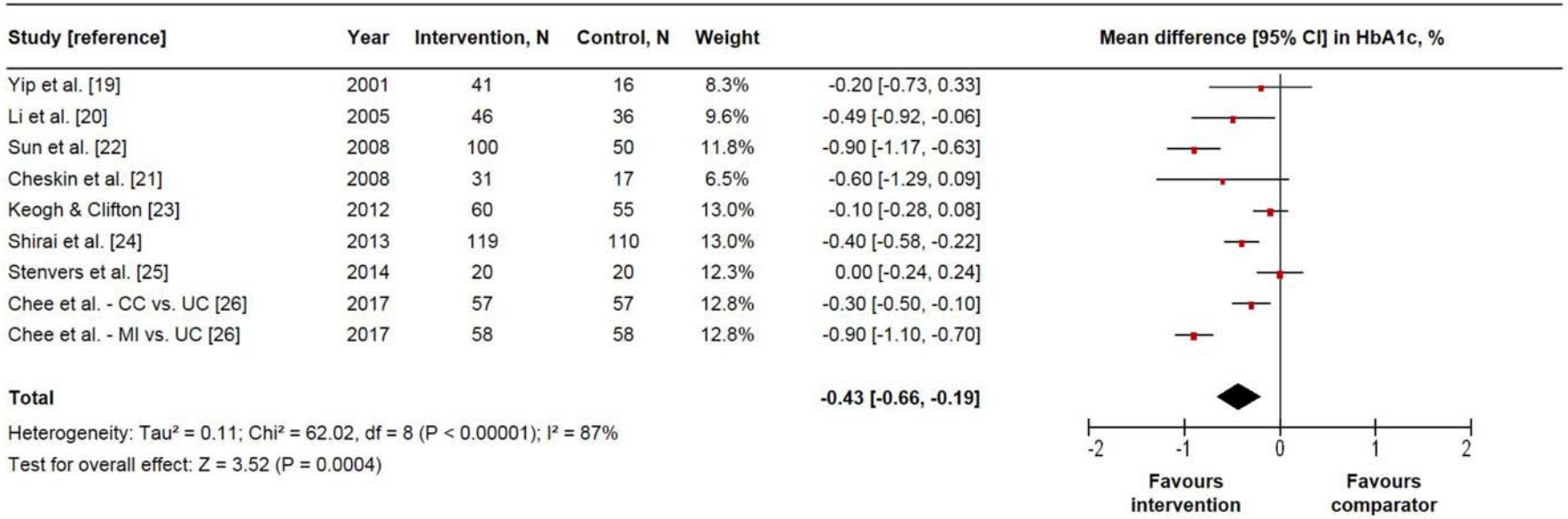
SUPPLEMENTARY DATA

Supplementary Figure 6. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on waist circumference. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



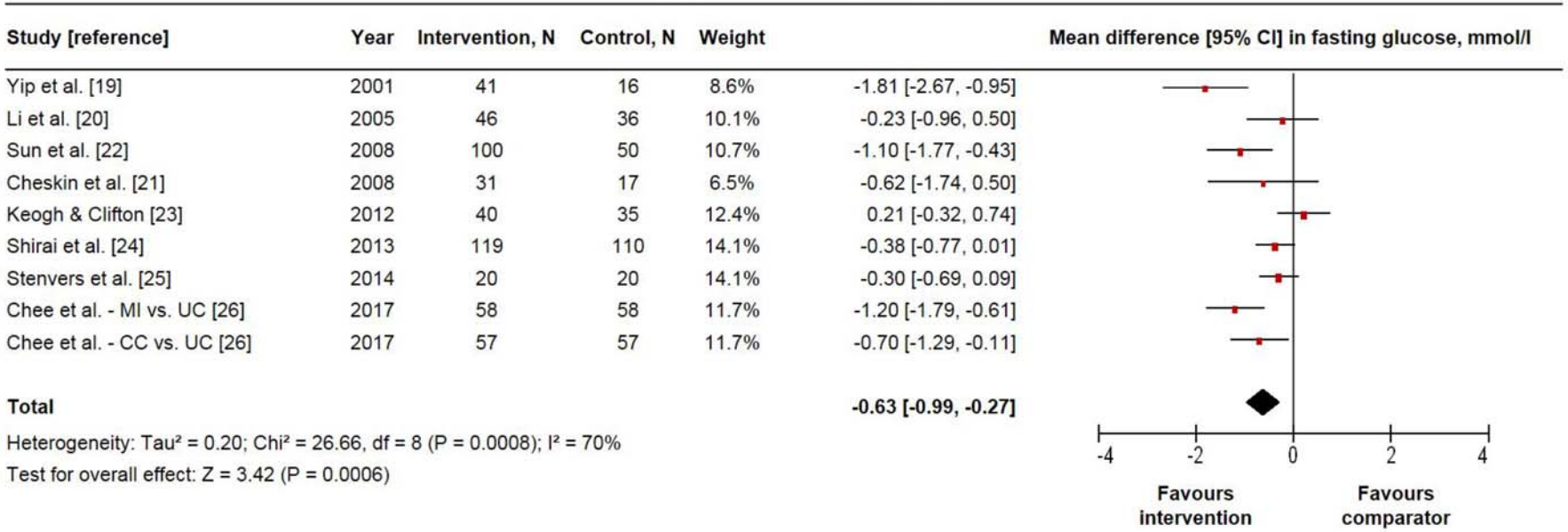
SUPPLEMENTARY DATA

Supplementary Figure 7. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on HbA_{1c}. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



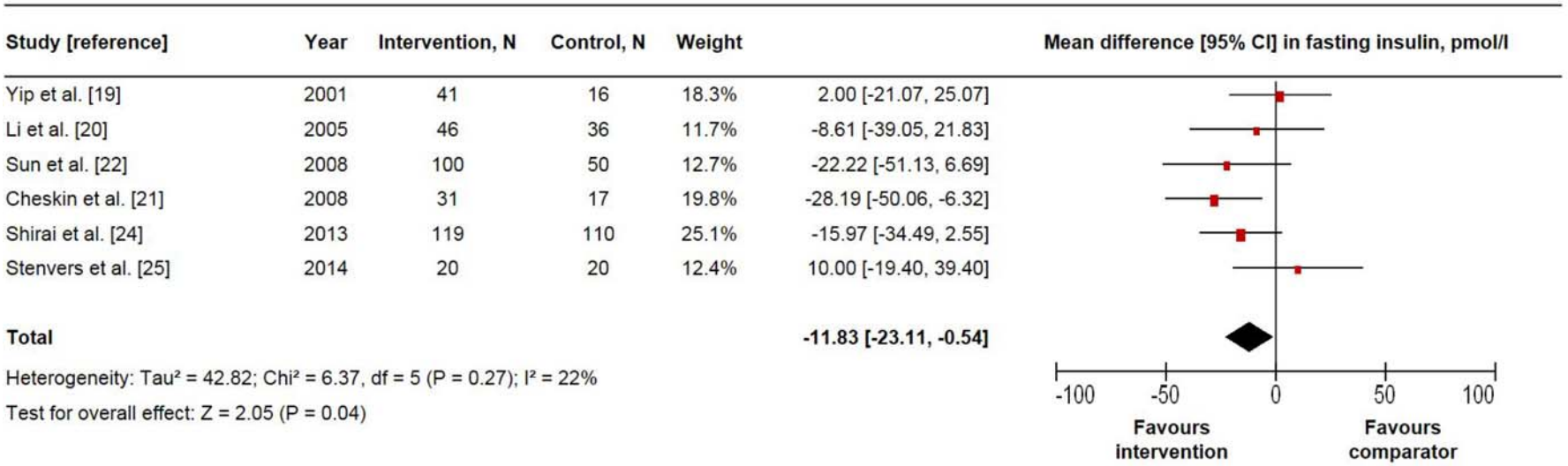
SUPPLEMENTARY DATA

Supplementary Figure 8. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on fasting glucose. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



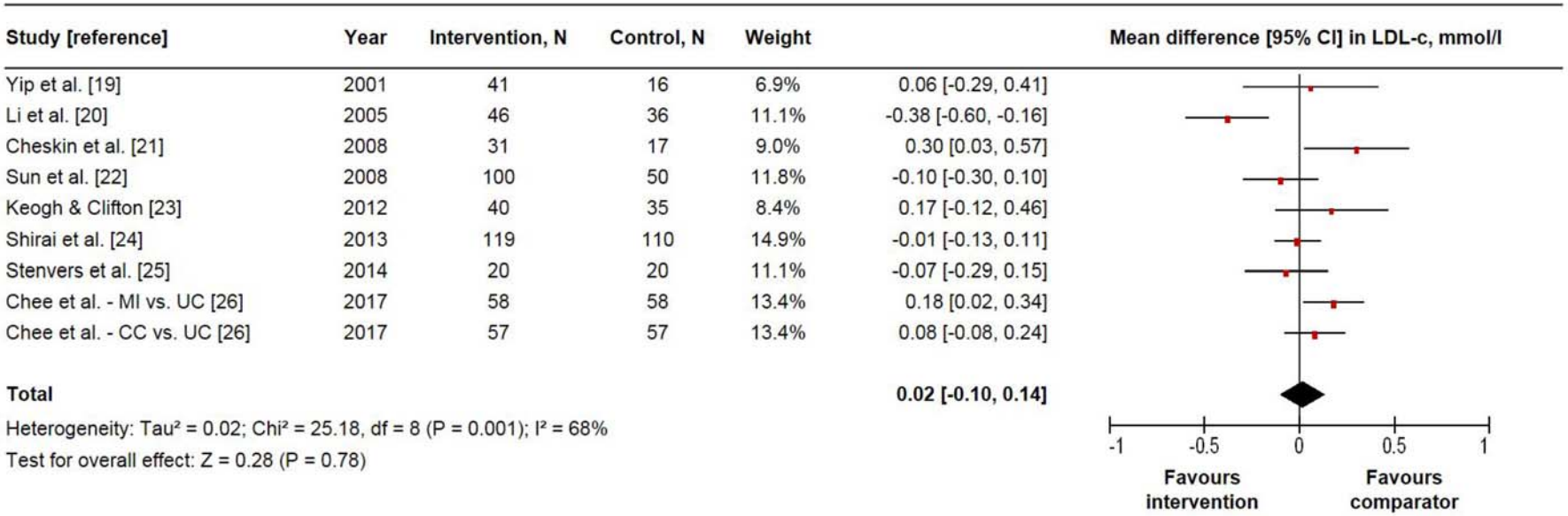
SUPPLEMENTARY DATA

Supplementary Figure 9. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on fasting insulin. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2.



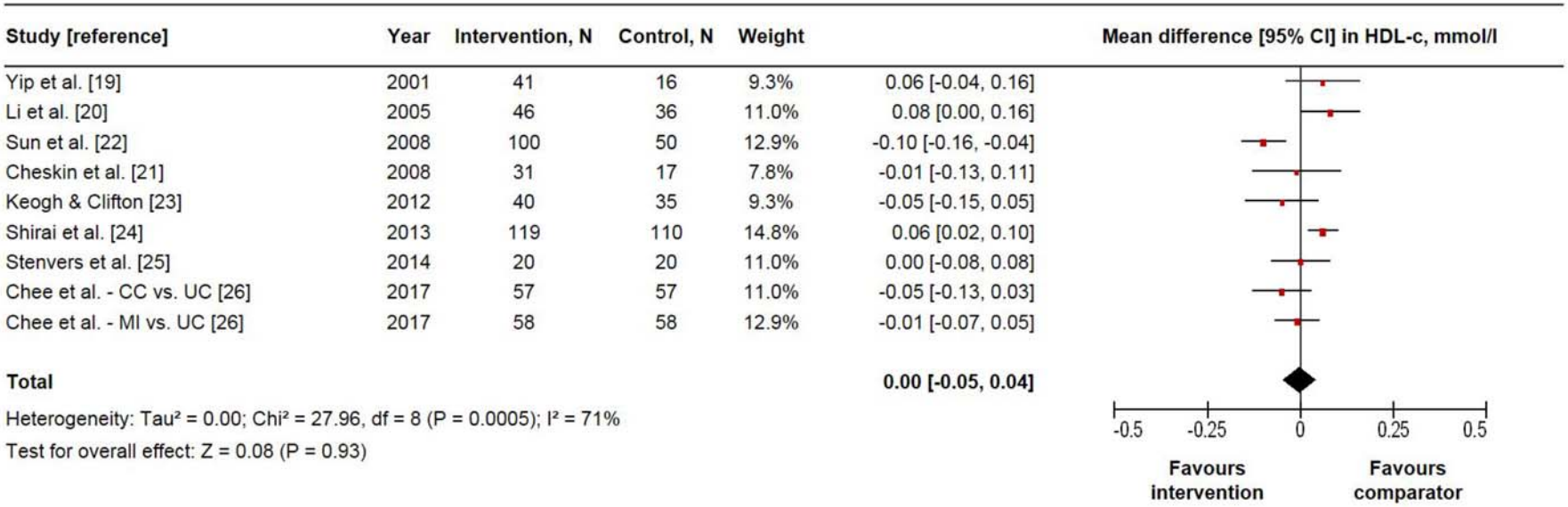
SUPPLEMENTARY DATA

Supplementary Figure 10. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on LDL-c. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



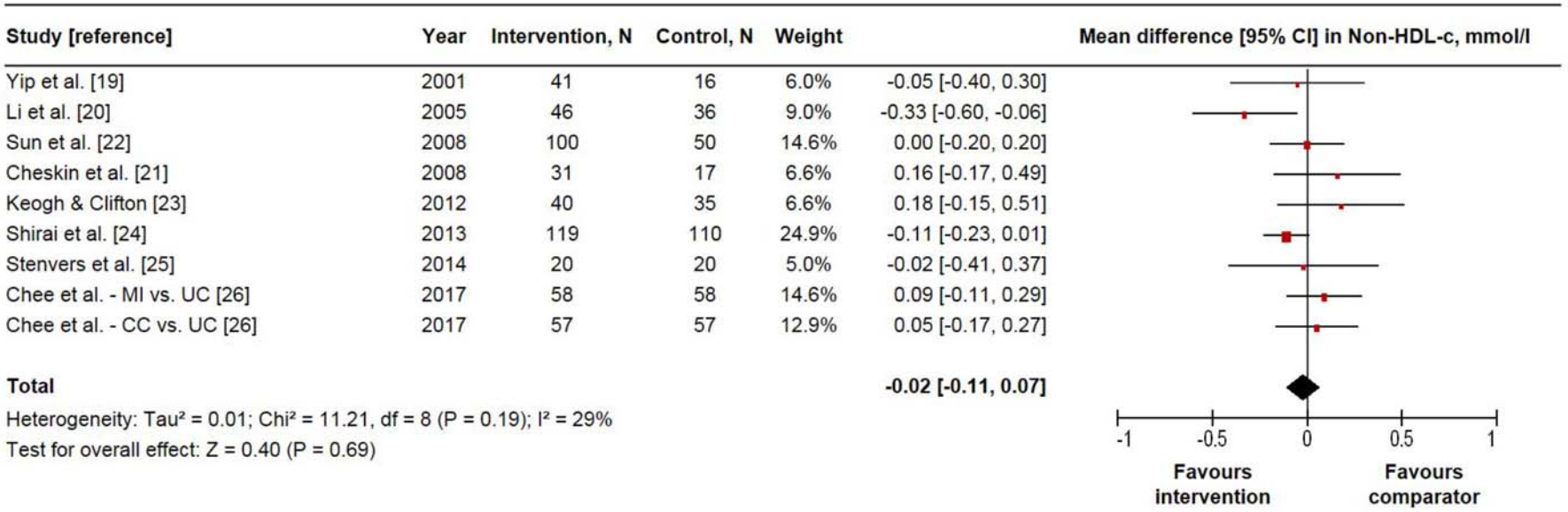
SUPPLEMENTARY DATA

Supplementary Figure 11. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on HDL-c. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



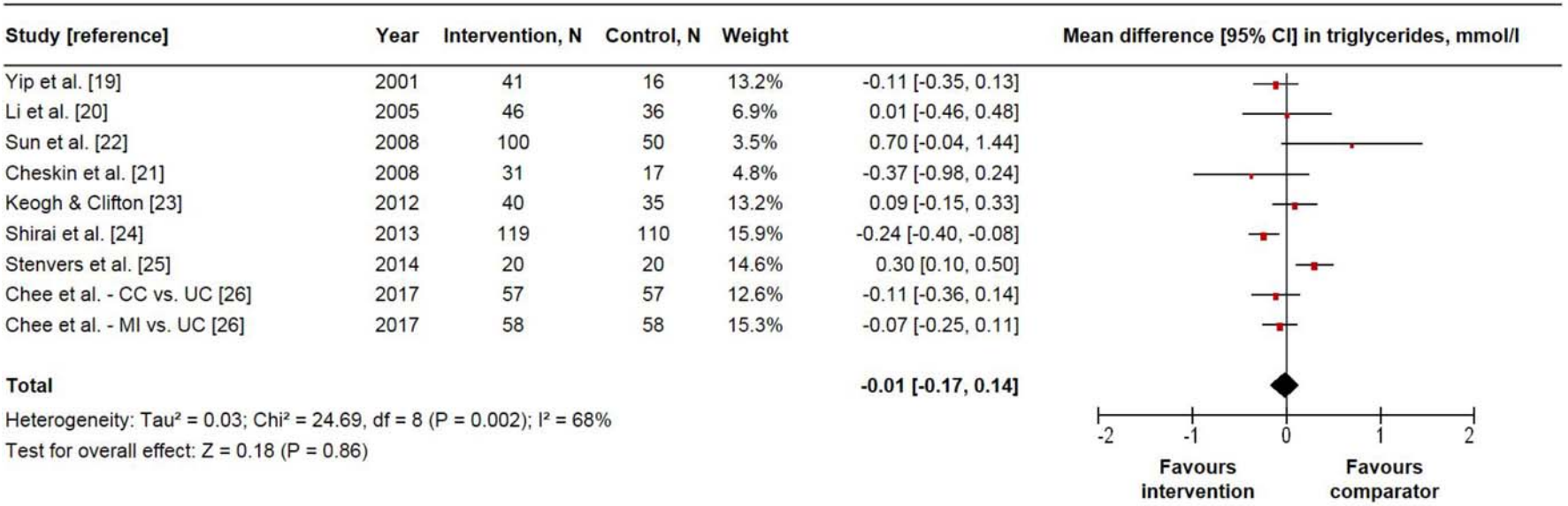
SUPPLEMENTARY DATA

Supplementary Figure 12. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on non-HDL-c. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



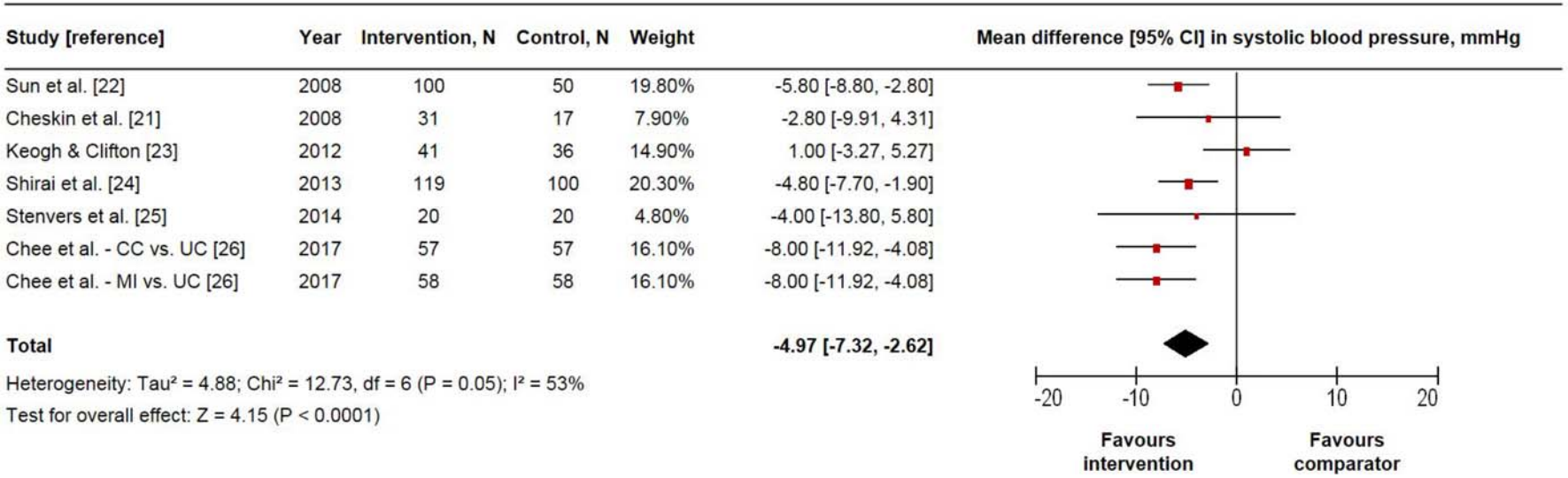
SUPPLEMENTARY DATA

Supplementary Figure 13. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on triglycerides. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



SUPPLEMENTARY DATA

Supplementary Figure 14. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on systolic blood pressure. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.



SUPPLEMENTARY DATA

Supplementary Figure 15. Forest plot of the effect of liquid meal replacements as part of a weight loss diet (intervention) compared with traditional low-calorie weight loss diets (comparator) on diastolic blood pressure. Pooled effect estimates for the overall effect is represented by the diamond. Data are expressed as mean differences (MDs) with 95% confidence intervals (CIs), using the generic inverse variance method with random-effects models. Paired analyses were applied to all crossover trials. Interstudy heterogeneity was tested by the Cochran Q-statistic at a significance level of $P_Q<0.10$ and quantified by I^2. CC, conventional counselling; MI, motivational interviewing; UC, usual care.