Intermittent fasting interventions for the treatment of overweight and obesity in adults aged 18 years and over: a systematic review.

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INTRODUCTION

Intermittent fasting or intermittent energy restriction (IER) is a novel approach to weight management which includes dietary fasting approaches; alternate day (ADF); 5:2 or 'Fast Diet'; periodic fasting of at least 1 day per calendar week. Despite the recent popularity of IER and associated weight loss claims, the current supporting evidence base is limited.

OBJECTIVE

The main objective of this study was to systematically review the available evidence to examine the effectiveness of intermittent fasting, known hereafter as IER in the treatment for overweight and obesity in adults, when compared to usual care treatment (continuous daily energy restriction (CER) – reduced calorie diet) or no treatment (*ad libitum* diet).

METHODS

Table 1: Summary of systematic review methods

Population	**Overweight or obese (BMI ≥ 30 kg/m²) adults (≥ 18 years).**
Intervention	**IER:** defined as consumption of 800 kcal or less on at least 1 day, but no more than 6 days per week.
Comparator intervention	**CER:** consisted of advice to continuously follow a reduced calorie diet, approximately 25% of daily recommended energy requirements **Control:** *ad libitum* diet
Inclusion criteria	Interventions were included if they provided a minimum duration of 12 weeks between baseline & post outcome measures. Inclusion criteria reflect current clinical guidance for effective weight management programmes.
Outcomes	**Primary outcome:** Change in body weight. **Secondary outcomes:** **Anthropometric outcomes:** Change in BMI; waist circumference; fat mass; fat free mass. **Cardio-metabolic risk markers:** Change in blood glucose & insulin, lipoprotein profiles (total, cholesterol, LDL cholesterol, HDL cholesterol, triglycerides) & blood pressure.
Study Design	Randomized control trial or pseudo-randomized control trial
Systematic Search	**Electronic databases:** Medline; Embase; CINAHL; Cochrane Central Register of Controlled Trials (CENTRAL) **The search for unpublished studies included:** Clinicaltrials.gov; ISRCTN registry; anzctr.org.au
Data Extraction*	Standard data extraction tool from Joanna Briggs Institute Meta-Analysis of Statistics Assessment & Review Instrument (JBI-MAStARI)
Quality Assessment*	Standard critical appraisal instrument from JBI-MAStARI
Data Synthesis	Quantitative outcomes, where possible were pooled in statistical meta-analysis. Effect sizes were reported as the weighted mean differences (WMD; 95% confidence intervals). Heterogeneity was assessed statistically using standard measures of I^2 and T^2.

*Conducted by two independent reviewers.

Table 2: Summary of study and participant characteristics

Study characteristics	IER	CER/Control
Sample Size Range	10 to 53	10 to 54
IER regimen	ADF n = 2 5:2 'Fast Diet' n = 2 ≥ 4 days fasting n = 2	CER n = 4 Control n = 2
Attrition **Mean n (range)** **Mean % (range)**	 10 (1-17) 29 (6-60)	 6 (0-12) 24 (0-70)
Study duration	5.6 months (range: 3 months to 12 months)	
Quality assessment (mean score out of 10)	5.5 (range 4-8)	
Population characteristics		
Weight Range (Mean kg)	77.0-94.7	77.0-98.6
BMI Range (Mean kg/m²)	26.0-35.0	26.0-35.6
Age Range (Mean years)	40.0-48.6	37.0-49.0
Gender (F/M)	218 / 6	172 / 4

RESULTS

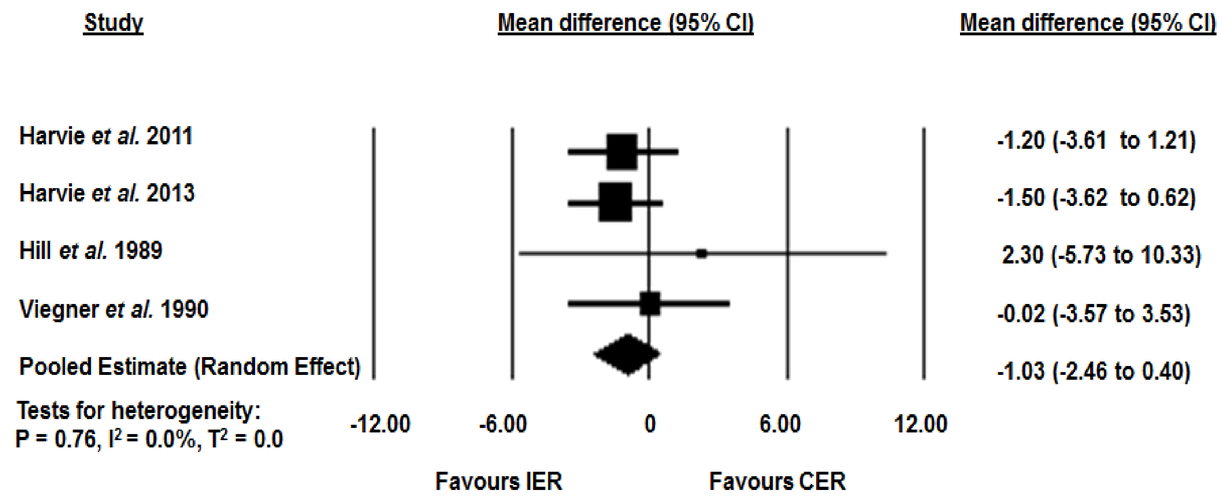

Figure 1: WMD in body weight (kg) between the IER interventions & CER interventions.

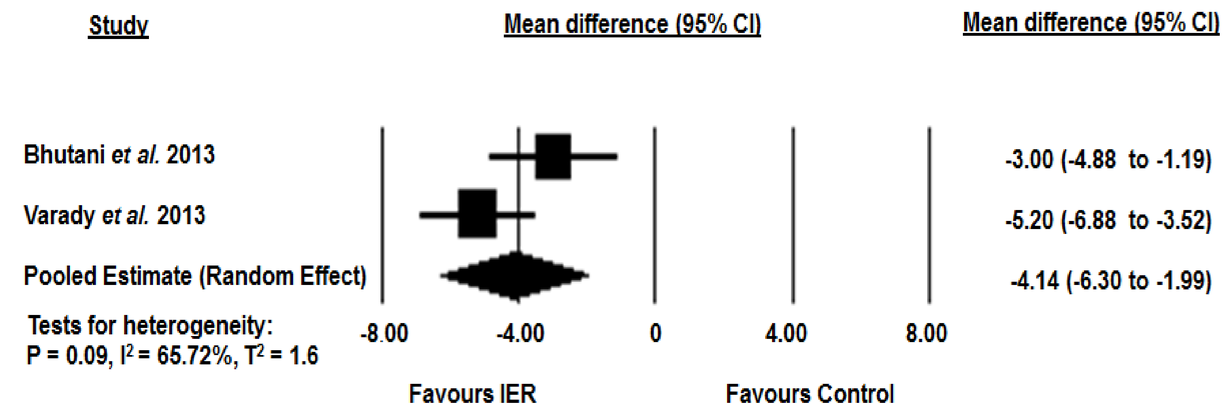

Figure 2: WMD in body weight (kg) between the IER interventions & control interventions.

Table 3: Pooled effect sizes (WMD) of secondary outcomes

				Heterogeneity		
Outcomes	K	Pooled estimate (95% CI)	P-value	Q (p-value)	I^2	T^2
IER vs CER						
Waist circumference (cm)	2	-2.14 (-3.53 to -0.75)*	0.002	0.01 (0.938)	0.0%	0.00
Fat mass (kg)	2	-1.38 (-2.47 to -0.28)*	0.014	0.49 (0.483)	0.0%	0.00
Fat free mass (kg)	2	-0.02 (-0.80 to 0.76)	0.958	1.90 (0.168)	47.5%	0.15
Glucose (mmol/l)	2	0.00 (-0.05 to 0.05)	1.000	0.000 (1.000)	0.0%	0.00
Insulin (pmol/l)	2	-4.66 (-9.12 to -0.19)*	0.041	2.57 (0.109)	61.1%	6.36
Total cholesterol (mmol/l)	3	-0.14 (-0.50 to 0.23)	0.458	27.33 (<0.001)	92.7%	0.10
LDL (mmol/l)	2	-0.05 (-0.15 to 0.05)	0.343	1.08 (0.298)	7.7%	0.00
HDL (mmol/l)	2	0.03 (-0.10 to 0.16)	0.645	6.59 (0.010)	84.8%	0.01
TAG (mmol/l)	2	-0.03 (-0.10 to 0.03)	0.314	0.690 (0.406)	0.0%	0.00
IER vs Control						
Fat mass (kg)	2	-3.24 (-4.55 to -1.92)*	<0.001	1.12 (0.290)	10.7%	0.14
Systolic BP (mmHg)	2	-4.29 (-11.13 to 2.56)	0.220	2.13 (0.144)	53.0%	13.00
Diastolic BP (mmHg)	2	-3.81 (-11.64 to 4.02)	0.340	2.78 (0.095)	64.1%	20.50

*Significant between group difference p < 0.05

CONCLUSION

IER is as effective as CER for short term weight loss in overweight & obese adults.

Further evidence is required to justify the clinical use of IER as an effective long term approach to the treatment of obesity.

Research is necessary to justify generalisability of this approach to a wider population including men & both young and older adults.