

The comparative effects of continuous (CER) versus intermittent (IER) energy restriction on anthropometry and diet quality (DQ) in a selected group of National Health Service (NHS) weight-loss patients

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Introduction

Intermittent energy restriction (IER) is of considerable interest in terms of both energy balance and its potentially beneficial effects on cardiometabolic health¹. IER involves short spells of severe energy restriction alternated with days of habitual energy intake, unlike continued energy restriction (CER) which involves a milder calorie restriction, but which occurs daily and over a prolonged period of time. CER is the first-line advice within the NHS for patients wishing to lose weight, although alternative approaches such as IER, have gained increasing attention. Whilst IER may be an effective, alternate approach to weight loss for those individuals who struggle to lose weight by CER, previous research in this area is limited to a small number of studies of short duration^{2,3}

Aims

To compare the effectiveness of IER with CER on a range of outcome measures, including weight loss and anthropometry, measures of glycaemic control and other biochemical markers of CVD risk in a selected cohort of obese weight-loss patients referred to a National Health Service (NHS) tier 3 obesity setting - the Rotherham Institute of Obesity (RIO). This is the first intervention trial seeking to compare CER versus IER within this setting. Analysis of these preliminary data from this ongoing trial was undertaken ahead of final publication.

Method

Data from the first 38 participants (11 males) who had completed the 26 week the dietary intervention are included here. Obese patients (aged 18-65 years) attending a clinic at RIO, self-selected to participate in either the CER or IER group. Written consent was gained from each participant and ethical approval was granted by the South Yorkshire NRES committee (14 YH 0018). The sole study centre for this trial was RIO; an NHS specialist centre for obesity management. RIO uses a multi-disciplinary approach to both reducing weight and helping maintain weight loss and brings together all the NHS currently approved and evidence-based methods into one primary care-based centre. Patients also have access to many specialists (e.g. dietitians, exercise therapists, talking therapists) who can help facilitate different approaches to support patients' weight-loss efforts.

Participants in the CER group ($n = 15$) were instructed to follow a healthy diet, aiming for a daily energy deficit of 500 kcal. Participants in the IER group ($n = 23$) were instructed to follow a healthy diet 5 days per week, and on their 2 'fast' days per week to consume a formula-based 600 kcal very low-calorie diet, using LighterLife FastpacksTM.

Further information regarding the LighterLife FastpacksTM is provided in **Table 1**.

Anthropometric measures and body composition were assessed at baseline (week 0), week 4, 8, 12, 16, 20 and 26, and DQ was evaluated using the Eating Well Index (EWI), specifically designed for use in this study population. Appropriate statistical analyses were performed and significance was assumed at $P < 0.05$. Comparisons were conducted on an intention-to-treat basis, in a last-observation-carried-forward analysis.

Table 1. LighterLife FastpacksTM

LighterLife Fast is a commercially available 5:2 intermittent fasting plan which utilises **LighterLife FastpacksTM**.

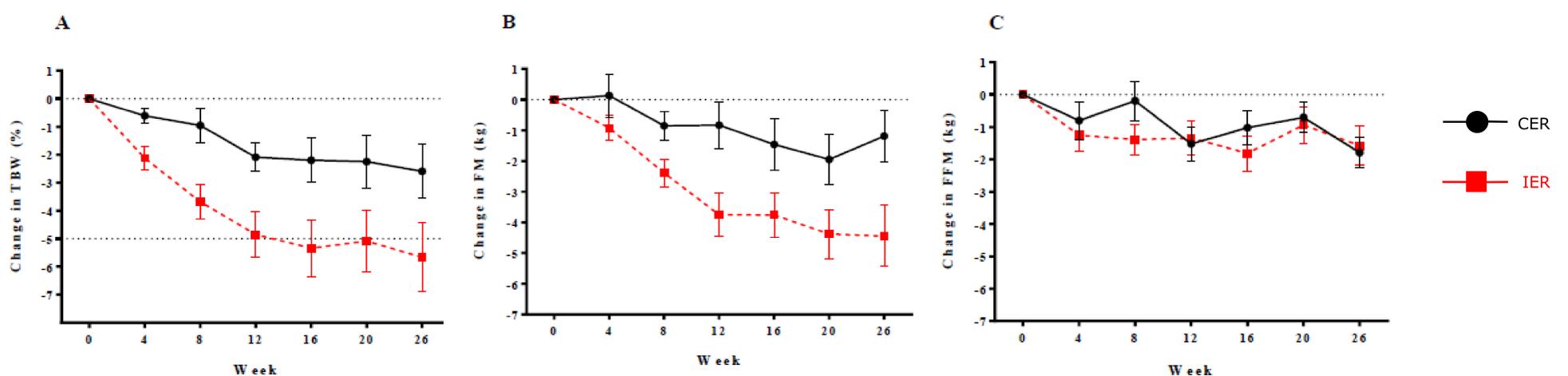
Each **FastpackTM** is specially formulated to ensure it provides:

- 150 kcal
- 25% of the RNI for vitamins and minerals
- minimum 12.5g of carbohydrate and PDCAAS 1.0 protein
- approximately 5g of fat
- minimum 2.5g of fibre

By consuming 4 FastpacksTM during each 'fast' day, an individual will receive **600 kcal** and **100%** of the RNI for vitamins and minerals.

Results

Figure 1. Changes in anthropometry during a 26 week intervention trial comparing IER vs CER



Total body weight (TBW) decreased by 5.66% ($\pm 1.24\%$) in the IER group and 2.2% ($\pm 0.79\%$) in the CER group ($P = 0.017$), **Figure 1A**. Fat mass (FM) decreased by 4.4 kg (± 0.99 kg) in the IER group and 1.2 kg (± 0.86 kg) in the CER group ($P = 0.012$), **Figure 1B**, and changes in fat-free mass (FFM) were comparable between groups, **Figure 1C**. EWI scores were poor (< 5 out of 10) in both groups throughout the study, and consumption of protein was significantly higher in IER group ($P < 0.05$).

Discussion & Conclusion

Both groups lost weight during the 26 week dietary intervention. However, contrary to the majority of prior research^{2,3,4,5}, the IER group experienced a greater reduction in TBW. A sparing of FFM, observed in the IER group, may have been due to consuming a higher proportion of their energy intake from protein, although comparisons of physical activity between groups were not measured. The present trial directly reflects the 'real-life' implementation of weight management programmes, and is thus clinically meaningful. As the NHS promotes patient-centred care, participants self-selected their intervention groups. This may have impacted on the motivation of participants, although this is likely to be comparable between the groups. Nonetheless, a lack of positive changes in food-related behaviours in both groups may have longer term implications in terms of future weight maintenance and chronic disease risk. Overall, in this study, neither CER nor IER alone appeared to facilitate the improvement in DQ essential for long-term health and weight management. IER may be superior at reducing TBW and FM whilst preserving FFM, however, analysis of data from the final study cohort is required to fully evaluate the long-term efficacy of IER in this NHS tier 3 setting.