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Intermittent Fasting in Weight Management

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INTERMITTENT FASTING IN WEIGHT MANAGEMENT

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Abstract

Obesity is associated with a variety of medical conditions that adversely affect metabolic and cardiovascular health. In order for health care providers to adequately educate and promote weight management, they need to be aware of the various dietary regimens and the efficacy and adverse effects associated with each. This literature review assesses the efficacy, metabolic benefits, and cardiovascular benefits of both intermittent energy restriction and continuous energy restriction from ten articles found on various databases within the past five years. The findings indicate that although not proven superior or inferior, intermittent energy restriction provides statistically similar results to continuous energy restriction when assessing efficacy of weight loss. There are also similar metabolic and cardiovascular benefits when comparing intermittent energy restriction and continuous energy restriction, although continuous energy restriction may have a benefit in the diabetic population due to potential adverse side effects in diabetics adhering to intermittent energy restriction. The result of this literature review allows providers to recommend an alternative weight management technique in patients who are unsuccessful or unable to adhere to a continuous energy restriction diet.

Keywords: intermittent fasting, intermittent energy restriction, continuous energy restriction, efficacy, weight loss, metabolic benefits, cardiovascular benefits

Introduction

- Obesity is defined as a weight that is higher than what is considered healthy for a specific height and is measured by using an adult body mass index, or BMI. The prevalence of obesity in United States adults was around 39.8% in 2015-2016. Medical conditions associated with obesity are some of the leading causes of preventable early death. Obesity related medical costs were calculated to be $147 billion in 2008. (Center for Disease Control and Prevention, 2018)
- Weight loss using any technique decreases cardiovascular and diabetic risk factors including plasma glucose, insulin, triglycerides, and leptin (National Institutes of Health, 2016).
- Daily calorie restriction, or continuous energy restriction (CER), consists of limiting calories consumed throughout the day. Intermittent fasting, or intermittent energy restriction (IER) consists of intermittent periods of energy consumption, or intake of calories, alternating with intermittent periods of complete energy restriction, or lack of calorie intake.

Statement of the Problem

- There continues to be a variety of new weight loss mechanisms that are utilized despite lacking research on the efficacy and safety. Many of these dietary regimens also provide unrealistic goals for long term adherence. Studies are needed to analyze the efficacy and safety of newer weight management methods that can treat or prevent obesity and improve health parameters.

Research Questions

- In overweight or obese adults, is intermittent fasting versus control more effective in decreasing body mass index and promoting health?
- In overweight or obese adults, does adherence to an intermittent energy restriction diet compared to a continuous energy restriction diet provide greater efficacy regarding weight loss and health benefit?

Literature Review

- **Intermittent Energy Restriction**
  - Weight Loss
    - IER showed statistically significant weight loss in comparison to control groups ($p = 0.001$) (Harris et al., 2018).
    - IER resulted in a 3.5 kg weight loss compared to a 2.0 kg weight loss in the control group ($p = 0.03$) (Li et al., 2017).
  - Health Benefits
    - Energy restriction resulted in decreased carbohydrate oxidation ($p = 0.023$) and increased lipid oxidation ($p = 0.08$), total energy restriction more than partial, in comparison to the isogenic control (Antoni et al., 2016).
    - Individuals adhering to IER had a lower risk of developing diabetes ($p = 0.044$), with two studies noting an overall decrease in coronary artery disease ($p = 0.007$; $p = 0.019$). One trial did note an increase in low density lipoproteins and high-density lipoproteins following fasting upon evaluation of one day of fasting, with another study noting lower low-density lipoprotein cholesterol following six weeks of fasting. Another trial provided evidence that IER significantly increases HGH, increasing lipolysis and fat metabolism. (Horne et al., 2015)
    - Fasting showed a significant decline in systolic and diastolic blood pressure ($p = 0.01$; $p = 0.003$). A slight improvement in hemoglobin A1C was noted in fasting although this result was not statistically significant. No side effects were noted in participants adhering to either dietary regimen. (Li et al., 2017)

- **Intermittent vs. Continuous Energy Restriction**
  - Weight Loss
    - Weight loss between IER and CER subjects were not significantly different ($p = 0.156$), with approximately seven kilograms of weight loss noted (Harris et al., 2018).
    - Weight loss was shown in all IER groups regardless of length of study, with no significant difference noted upon comparison to CER weight loss ($p = 0.458$) (Headland et al., 2016).
    - Comparing IER to CER, the results showed no significant difference in efficacy regarding weight loss (Seimon et al., 2015).
    - Similar body weight reduction between the IER and CER groups ($p < 0.001$) (Carter et al., 2016).
    - Approximate 12.5% loss in body weight in both the CER and IER groups (Coutinho et al., 2018).
    - Similar impact on weight loss ($p = 0.6$) and waist circumference between the groups (Sundfør et al., 2018).
    - CER provided increased weight loss and a beneficial effect on insulin resistance, although both diets had a decrease in body mass index (Aksungar et al., 2016).

Literature Review

- **Intermittent vs. Continuous Energy Restriction**
  - Health Benefits
    - Similar comparison in hemoglobin A1C, indicating similar glycemic control between the IER and CER groups ($p < 0.001$) (Carter et al., 2016).
    - In both IER and CER, postprandial cholecystokinin decreased and exercise efficiency increased at 10 weeks. In the IER group, basal and postprandial active ghrelin increased ($p < 0.05$) with a decrease in resting metabolic rate and increase in exercise efficiency noted in long term assessment of 25 and 50 weeks ($p < 0.001$). In the CER group only, basal active GLP-1 decreased ($p = 0.033$). (Coutinho et al., 2018)
    - Both IER and CER showed similar improvement in blood pressure, triglycerides, and high-density lipoprotein cholesterol. In a six-month maintenance phase, weight regain was similar between the two groups ($p = 0.6$). When assessing hunger scores between the groups, IER participants scored higher and showed increased hunger scores ($p = 0.002$) which could potentially play a role in long-term adherence. (Sundfør et al., 2018)
    - IER was shown to have a positive effect on health and resistance to disease, with higher urinary acetoacetate levels confirming a more constant lipid catabolism than that during CER (Aksungar et al., 2016).

Discussion

•Intermittent Energy Restriction

- The clinical trials and systematic reviews analyzed provided substantial evidence that IER is superior to a placebo in regard to efficacy in weight loss.
- IER is associated with a variety of cardiovascular and metabolic health benefits.

•Intermittent vs. Continuous Energy Restriction

- IER provides similar weight loss when compared to CER although there is no significant evidence that shows that one weight loss mechanism is superior or inferior to another.
- The benefits on health parameters are likely linked to decreased adipose tissue rather than associated with a specific weight loss mechanism with both groups showing similar cardiovascular and metabolic health benefits.
- CER may be more beneficial in the diabetic population.

• Limitations

- Studies analyzed had relatively small sample sizes and thus generalization is difficult
- Limited studies on side effects
- Longevity is lacking in most studies
- Data is lacking on efficacy and safety in populations with comorbid conditions

Applicability to Clinical Practice

- There is significant evidence that IER has similar efficacy to CER in regard to weight loss, thus providing an alternative weight management technique for patients who have struggled to lose weight or adhere to daily calorie restriction. The research also shows similar health benefits and limited adverse effects in those adhering to an IER diet, providing evidence that IER is a safe and beneficial alternative. The information provided in the literature review will allow clinicians to recommend an alternative weight management technique for overweight or obese patients based on clinical evidence from various research studies. IER provides a beneficial alternative for weight management in those with limited health concerns and those with cardiovascular or other risk factors or diseases.
- Although beneficial for most patients, there is limited evidence about the efficacy and safety of IER in diabetic patients. There remains concern about adverse effects and hypoglycemia in patients on insulin therapy and thus should be referred to a weight management specialist and diabetes educator for weight management in this patient population until further research is provided.

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