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Review Article

Intermittent fasting - A boon or A bane

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Abstract

Nowadays different methods are becoming very popular for weight loss and intermittent fasting is one of them. It is gaining very much popularity and is practiced in different formats by people for weight loss as well as for improvement in insulin resistance, correction of lipid profile and many more clinical conditions. A lot of research work has carried out on different aspects of intermediate fasting on human health. Much of this work has been carried on experimental animals. Research's have shown that intermittent fasting is helpful in weight reduction as well as diabetes control, reducing risk factors of cardiovascular diseases, reduction in risk factors of cancer and many more. As most of the researches have been performed on animals therefore there is scope of research on humans on the effect of intermittent fasting in different clinical conditions. At present on the basis of review collection, it can be concluded that intermittent fasting should be recommended under the supervision of health professionals only under careful monitoring keeping in mind all benefits and risk potentials of various methods of intermittent fasting.

Keywords

Weight loss, intermittent fasting, food, complex carbohydrate, high fibre, simple sugars

Introduction

Intermittent fasting is known as a period of abstinence from consuming food. It's not a new concept and has been practiced since long ago around the globe in some or other form. Although nowadays it has been propagandized a lot everywhere majorly for weight loss purposes.

It is a pattern of diet that rotates around periods of fasting and eating. Mainly it specifies only the period of fasting and eating rather than type of food. It's more of an eating pattern or lifestyle rather than a conventional diet.

Types of intermittent fasting

There are different types of intermittent fasting methods. Some of them have been discussed as below:

S. No.	Intermittent fasting method	Description
1	The 16/8 method	It involves restricting the eating window to 8 hours followed by 16 hours fasting.
2	Lean gains method	In this, per day fasting for women and men is recommended for 14 & 10 hours respectively & person is asked to have low carb high protein foods during his eating window
3	Alternate day fasting	It involves consuming regular diet for one day and fast on the another day
4	Eat-Stop-Eat	It involves 24 hours fasting once or twice a week
5	The 5:2 diet	It involves calorie restriction to 500 - 600 calories for 2 days a week
6	Time-restricted feeding	It includes generally <3 meals per day with ad libitum energy intake within specified time frame followed by prolonged fasting period
7	Religious fasting	Different types of fasts done for religious purposes
8	Ramadan fasting	It is the very common religious fasting method that involves fasting from sunrise to sunset and consumption of one lighter meal before dawn and a large meal after sunset.

https://www.onthebuzz.in/intermittent-fasting-a-lifestyle-or-just-a-diet/
Patterson and Dorothy, 2017

How intermittent fasting works to help human health

This can be described by different body mechanisms like -

a. Circadian biology

It is the synchronization of our body towards light and dark clock cycles in a day. This change in lightness or darkness in a day brings some changes in our biology and behavior. It is research proven that deviation from this circadian clock may lead to risk of degenerative diseases (Scheer et al., 2009). A person need to listen to their hunger or satiety signals as these signals are left unheard or odd timing lifestyle including diet, exercise & sleep may imbalance energy cycle of our body (Challet, 2013). Evidence on the

behaviour patterns are based on animal studies (Sensi et al., 1993; Eckel-Mahan et al., 2013). Many researchers have shown that shift-work hours disrupt circadian cycle that is associated with the risk of cardio metabolic disease and risk of cancer (Stevens & Rea, 2001; Straif et al., 2007; Stevens et al., 2007; Savvidis & Koutsilieris, 2012; Grundy et al., 2013). Hatori et al., 2012 analyzed in animal study locomotion was affected by circadian clock in mice. An improvement was found in muscle coordination on a time-bound, isocaloric feeds.

b. Gut Microbiome

Many researchers have proved that gut micro flora that affects our metabolic health is regulated by diet diversity and food signals (Turnbaugh et al., 2006; Tilg & Kaser, 2011; Ridaura et al., 2013; Xu & Knight, 2015).

c. Modifiable lifestyle behaviors like diet, exercise and sleep

Different types of fasting patterns have the capability to modify health behaviors. Gill & Panda (2015) reported that night fasting for ≥14 hours resulted in statistically remarkable decrease in calories intake and weight with an improvement in sleep, satiety and energy levels. Similarly, a study conducted by Chowdhury et al. (2016) showed that prolonged morning fasting by skipping breakfast didn't increase food intake at lunch nor did it lead to any increase in appetite after lunch. Many researches (Buxton & Marcelli, 2010; Ford et al., 2014; Grandner et al., 2010; Patel & Hu, 2008; Spiegel et al., 2008) have reported increased risk of insulin resistance and increased risks of obesity, diabetes, cardiovascular disease, and cancer by irregular lifestyle like nighttime eating that also negatively affected the duration and quality of sleep (Antelmi et al., 2014; Yamaguchi et al., 2013). Tinsley and La Bounty (2015) examined the effect of intermittent fasting on body composition and disease specific clinical health markers. It was categorized into alternate-day fasting, whole-day fasting, and time-restricted feeding. All fasting regimens improved body fat and lipid profile positively in normal, overweight and obese individuals.

Foods to be eaten in intermittent fasting

High protein like lean meat, poultry, egg, nuts, lentils, yogurt with plenty of fruits and vegetables are beneficial for weight loss purposes. In beverages, green tea with lemon, lemon ginger tea, apple cider vinegar, black coffee, cucumber and lemon juice can be added to keep the body hydrated and fueled with lots of antioxidants.

Foods to be avoided in intermittent fasting

High fat/ trans fat and low fibre foods should be avoided that include processed meat & fried foods, refined flour & sugar.

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Pros and Cons of intermittent fasting

To ascertain the effects of intermittent fasting on human health, an online search was done for different types of studies related to the topic. Various studies have shown that intermittent fasting can strongly benefit weight control and overall physical and mental health. It's benefits have been presented below-

Weight loss: Different modes of intermittent fasting ultimately cause calorie cut down in some or other way that leads to remarkable weight loss.

Insulin resistance: It has also been reported in many researches that intermittent fasting is helpful in protecting against insulin resistance.

Inflammation: Inflammatory markers have also shown a declining trend after different types of intermittent fasting methods.

Cardiac health: It is also helpful in reducing risk of cardiovascular diseases by reducing LDL (bad) cholesterol and triglycerides by affecting the biochemical transformations of lipids. It reduces the risk of developing atherosclerotic plaque by reducing the inflammatory markers like IL-6, homocysteine and C reactive protein. The mechanism behind this is related to a rise in adiponectin and reduction in leptin and resistin levels. It leads to inhibition of aggregation of blood cells, formation of extracellular deposits in inner arterial vascular lining of blood vessels.

Hypertension: Intermittent fasting has shown a positive impact in reducing hypertension. It causes a rise in BDNF factor (it stimulates excretion of acetylcholine by vagus nerve, it helps in reduction of the frequency of heart contractions) that is responsible in reduction of the systolic and diastolic blood pressure by activation of parasympathetic nervous system.
Obesity and diabetes: The intermittent fasting has been proved good in preventing obesity and diabetes also by reduction of amount of food consumption that helps in weight reduction. It also improves tissue sensitivity for insulin by increasing the B cells of the pancreas.

Besides this it is also helpful in reducing risk of cancer, improvement in brain health, anti aging and stress relieving etc. There are much evidence that 18 hours can alter the metabolism of the body to use ketone as a source of energy that was helpful in relieving stress, improved immunity and longevity and decreasing risk of cancer and obesity (Cabo & Mattson, 2019).

Malinowski et al. (2019) found that intermittent fasting was helpful in reducing the risk factors for cardiovascular problems.

Studies related to different types of intermittent fasting have been discussed further -

Alternate day fasting

Halberg et al., 2005 studied the effect of alternate day fasting on 8 male healthy non-obese adults for 15 days and found that alternate-day fasting with 20-hour fasting intervals. A significant decline was reported in glucose and leptin levels while an increase was observed in adiponectin content.

Heilbronn et al., 2005 performed research on 8 nonobese females and 8 males for 22 days having 36 hours fasting intervals. The data suggested a significant decrease in weight and insulin levels.

Another study on the effect of alternate day fasting on metabolic markers was performed by Horne et al. (2013) on 30 healthy adults including 20 females and 10 males. A significant decline was seen in weight, glucose, insulin and triglyceride levels with increased LDL and HDl levels.

Modified fasting regimen

Impact of modified fasting was seen on metabolic markers by Williams (1998) on 54 obese diabetic adults for 20 weeks including fasting for 1 day per week till 5 weeks. Results documented a significant decline in weight but no other remarkable change was observed in metabolic markers.

Johnson et al. (2007) performed a study on 8 females and 2 overweight males with asthma for 8 weeks. In the present work, <20% of food was given on alternate days while ad libitum diet was given on non fasting days. A significant decrease was seen in weight, triglycerides and tumor necrosis factor.

Twenty obese patients including 12 females and 8 males were studied for 8 weeks by Varady et al., 2009. Results showed a significant decline in weight, triglycerides and low density lipoprotein levels.

Bhutani et al. (2013) also showed similar types of results of alternate day fasting on 41 obese subjects.

Eshghinia & Mohammadzadeh (2013) reported a significant decrease in weight of 15 overweight females in 6 weeks.

Harvie et al. (2013) documented a remarkable decline in insulin levels, while no drastic change was observed in other metabolic markers in a study done on 77 overweight or obese females for a study period of 3 months with calorie restriction of 25% for 2 consecutive days in a week. A significant decline was reported in body weight, glucose, insulin and leptin levels by Hoddy et al. (2016) in a study carried out on 59 subjects with alternate fasting.

Time restricted feeding

A number of researches have been carried out on metabolic markers with time restricted feeding method. A significant decline in body weight, glucose and LDL levels was seen in the study of Carlson et al. (2007) carried out on 15 normal weight adults.

LeCheminant et al., 2013 also presented remarkable weight reduction in 29 normal weight males for 2 weeks.

Chowdhury et al., 2016 studied the effect of prolonged overnight fasting on 16 females and 8 obese males and reported decrease in free fatty acids and leptin levels after lunch.

Ramadan fasting

Ramdan fasting is a very common form of time-restricted eating pattern that may lead to transitory weight loss and improvements in metabolic markers but simultaneously it is not in compatibility of our normal biological clock because of which many researchers studied effects of Ramdan fasting on weight loss and metabolic markers. Meta analysis of 35 studies was done by Sadeghirad (2014). Out of these 35, 52% studies were done on both male and female while 34% work was performed on only males and 11% work was conducted on females only. Weight loss was found statistically significant in 60% of the studies, but on the contrary 16 studies reported gain in weight again after Ramadan. Kul et

al. (2014) also did a meta analysis in 2013 for 30 cohort studies on the effect of ramadan fasting on weight as well as changes in metabolic markers in healthy men and women. A significant reduction was observed in LDL and fasting blood glucose levels, while HDL cholesterol levels found to be increased significantly in females. Male subjects showed a significant decrease in weight, total cholesterol and triglyceride levels. Ramadan fasting also contributed a drastic reduction in hemoglobin A1c (HbA1c) levels (Yeoh et al., 2015). Mattson et al. (2017) showed beneficial effect of intermittent fasting on weight loss, insulin resistance and a decrease in risk factors for cardiovascular disease. Mechanism behind this improvement was attributed to improved mitochondrial health, DNA repair and autophagy.

Despite the many benefits of intermittent fasting, it has some proven disadvantages as well. Fasting may be harmful and not recommendable for patients suffering from hormonal imbalances, during pregnancy and lactation and for diabetics. Diabetic patients may undergo hypoglycemia if they are under medication of oral hypoglycemic agents. Besides this it is not suggested in case of eating disorders, BMI <18.5 kg/m2. Intermittent fasting is also contraindicated under some chronic medical issues for which a patient is under medication (Corley et al., 2018; Carter et al., 2018; Choudhary et al., 2017).

Although in some researches weight and insulin requirements have been reduced in diabetic patients after Intermittent fasting, still it's use is recommended only under careful monitoring.

Conclusion

Various methods of intermittent fasting have gained much popularity in recent era. It has not only shown improvement in weight reduction but also helpful as a non-pharmacological treatment method. It is a proven fact through various studies conducted on human and animals. However, an individual's present medical condition should be taken care of before recommendation of intermittent fasting as majority of data is available on animal studies only. Long-term impact of various types of intermittent fasting on humans is yet to be studied on various medical conditions like risk factors of cardiovascular conditions. It's use by the clinicians should be done under careful monitoring only. It's responsibility of health professionals to temper the excitement for intermittent fasting by analyzing it's benefits and risk judiciously in the light of evidences from epidemiologic studies and interventional trials.

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