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Intermittent Fasting: A Comprehensive Review on Weight Management, Cardiovascular Health, and Long-Term Wellness Strategies

Ms. Muskan N. Gawate, Ms Athira Mohanan, Ms Aasia A Radiowala
Anjuman-I-Islam's College of Hotel & Tourism Management Studies & Research, Mumbai

Abstract: *Intermittent fasting (IF), characterized by time-restricted feeding, has emerged as a popular and promising strategy for weight loss and health improvement. This review integrates various aspects of IF, with a primary focus on its effects on the cardiovascular system, including atherosclerosis, type 2 diabetes mellitus, blood pressure, lipid profile, and inflammation. The prevalence of obesity has intensified the quest for alternative weight loss methods, making IF an appealing intervention. IF exhibits potential benefits for overweight and obese individuals with type 2 diabetes, enhancing metabolic health and reducing cardiovascular risk. The cost-effectiveness and low risk of adverse reactions associated with IF contribute to its attractiveness as an intervention. Additionally, IF's impact on insulin sensitivity and potential lifespan extension further highlights its holistic health benefits. The continuous need for calorie intake restriction underscores the importance of a comprehensive lifestyle change. While acknowledging the rise in the obesity epidemic, IF emerges as a plausible strategy for addressing not only weight loss but also promoting a healthier lifestyle and mitigating life-threatening diseases. This abstract emphasizes the multifaceted advantages of IF, acknowledging its potential to contribute to a paradigm shift in obesity treatment and health management.*

Keywords: Fasting, Intermittent Fasting, Weight Management, Cardiovascular Health and Long-Term Wellness Strategies

I. INTRODUCTION

In recent years, the prevalence of obesity has escalated, prompting a critical exploration of alternative and effective weight loss strategies. Intermittent fasting (IF), characterized by time-limited feeding patterns, has gained prominence as a promising approach not only for weight management but also for its potential impact on overall health. This review seeks to provide a comprehensive synthesis of the diverse facets of intermittent fasting, with a particular emphasis on its effects on the cardiovascular system.

The 16-hour fasting and 8-hour eating window, a common practice within intermittent fasting, has garnered attention for its purported benefits in weight loss, inflammation reduction, and improvements in cardiovascular health. As the obesity epidemic continues to pose significant challenges to public health, there is an escalating need for interventions that not only address weight concerns but also contribute to a holistic enhancement of metabolic health.

This introduction sets the stage for a detailed exploration of intermittent fasting, highlighting its potential implications for cardiovascular health, atherosclerosis development, type 2 diabetes mellitus, blood pressure regulation, lipid profile modulation, and inflammation reduction. By examining the multifaceted aspects of intermittent fasting, this review aims to contribute to the ongoing discourse surrounding effective and sustainable strategies for weight loss and overall health improvement in the context of contemporary health challenges.

OBJECTIVES:

the study aims to provide a more comprehensive understanding of the nuanced aspects and potential implications of intermittent fasting on various dimensions of health and well-being.

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II. REVIEW OF LITERATURE

It has been shown that prolonged fasting, alternate-day fasting, and other forms of periodic caloric detachment are gaining prominence in the lay press and among animal science scientists. If scientific data exists or is good enough to justify the use of nutritional regimens such as wellness interventions remains uncertain. [1] Intermittent fasting is a method of time-limited feeding (usually 16 hrs fasting and 8 hrs eating) that has gained popularity in recent years and is appealing as a possible new strategy in the approach to weight loss and inflammation reduction and has many potential long-term health benefits, focusing primarilyon its effects on the cardiovascular system, including the development of atherosclerosis, the benefits of type2 diabetes mellitus, lowering blood pressure, and exploring other cardiovascular risk factors (such as lipid profile and inflammation). [2] With the current obesity epidemic rising in terms of its magnitude & public health impact, continuous energy restriction along with a comprehensive lifestyle intervention is recommended for the treatment of obesity, this approach produces modest weight loss on average. Today due to this increase in obesity there has been an increased interest in finding out alternative weight loss methods that involve intermittent fasting & time-restricting feeding.[3] Sticking to the 8-hour calorie-restricting diet over an extended period of 12 weeks has proven to aid weight by reducing a lot of metabolic and other risk factors. [4] Intermittent on the one hand where are helps with weight loss & many metabolic risk factors also has been proven to have a remarkable effect on ageing & life span when tested on animals {Rats}. [5] It is also known to have a positive influence on lipid profile parameters—it reduces the concentration of total cholesterol, triglycerides, and LDL cholesterol, also known to help with Hypertension. [6]. The use of intermittent fasting can boost weight loss and improve the metabolic well-being of overweight and obese people with type 2 diabetes and reduce cardiovascular risk. This method of intervention is cost-effective and associated with a low risk of adverse reactions. Intermittent fasting (IF) has been shown to improve insulin sensitivity of the entire body, but it is unclear if it has a selective effect on intermediate metabolism. Such selectivity may have been beneficial when responding to times of food surplus and food scarcity. [8]

What is Intermittent Fasting?

Intermittent fasting is a method of time-limited feeding (usually 16 hrs fasting and 8 hrs eating) that has gained popularity in recent years and is appealing as a possible new strategy in the approach to weight loss and inflammation reduction and has many potential long-term health benefits. Intermittent fasting is an eating pattern where you cycle between eating and fasting periods. Intermittent fasting also known as intermittent energy restriction is an umbrella term for where there is meal timings scheduled for those cycles between voluntary and non-voluntary fasting. [2] Intermittent fasting schemes require 60–100 percent energy restriction on fast days with ad libitum energy consumption on fed days. Various intermittent fasting regimens have been suggested, the most common being alternate-day fasting (ADF) and a fasting regimen for two days per week (2DW). The popular and appealing aspect of intermittent fasting is that dieters do not have to reduce calories every day. Weight loss is likely to occur because individuals do not adequately compensate for the calorie deficiency that occurs on fasting days on non-fast days. Furthermore, the periodic nature of fasting can reduce the constant hunger associated with CER.[3]

Impact of Intermittent Fasting on Health

Impact on Cancerous Cells- Intermittent fasting is thought to impair the energy metabolism of cancer cells, inhibit their growth, and make them susceptible to clinical treatment. Intermittent fasting can also provide protection against cancer while enhancing the stress resistance of normal cells. Moreschi and Rous identified the beneficial effects of fasting and caloric restriction on tumors in animals. Since then, multiple animal studies have shown that daily caloric restriction or alternating-day fasting decreases the incidence of spontaneous tumors during normal rodent aging and suppresses the development of several forms of induced tumors while increasing their sensitivity to chemotherapy and irradiation. Similarly, intermittent fasting is thought to disrupt the energy metabolism of cancer cells, hinder their development, and make them vulnerable to clinical treatment. Activation of transcription factors and downstream targets via intermittent fasting may provide protection against cancer while enhancing the stress resistance of normal cells. Clinical trials of extended fasting in patients with cancer have been performed or are underway. Most of the initial research concentrated on the compliance, side effects, and characterization of biomarkers. Ongoing trials in

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ClinicalTrials.gov concentrate on extended fasting in patients with breast, ovarian, prostate, endometrial, and colorectal cancer and glioblastoma.[5]

Impact on Cardio Vascular Diseases- Intermittent fasting can reproduce some of the cardiovascular benefits, such as improvements in blood pressure and heart rate that can be seen with physical exercise. Intermittent fasting increases several measures of cardiovascular health in animals and humans, including blood pressure; resting heart rate; high density and low-density lipoprotein (HDL and LDL) cholesterol, triglycerides, glucose and insulin; and insulin resistance. In addition, prolonged fasting decreases the symptoms of systemic inflammation and oxidative stress associated with atherosclerosis. Analysis of electrocardiographic recordings reveals that intermittent fasting improves heart rate variability by increasing parasympathetic tone in rats and humans. The CALERIE (Comprehensive Evaluation of Long-Term Effects of Lowering Energy Intake) research found that a 12 percent reduction in daily calorie intake over a span of 2 years improves many cardiovascular risk factors in non-obese individuals. Varady et al. stated that alternate-day fasting was beneficial for weight loss and cardio defense in normal and overweight adults. 59 Improvements in cardiovascular health metrics usually occur within 2 to 4 weeks of the start of an alternate day of fasting and then dissipate over a period of several weeks after a regular diet is resumed.[5]

Impact on Type 2 Diabetes- Intermittent fasting can minimize the occurrence of diabetes in laboratory animals and there is evidence that this form of fasting can also delay the development of type 2 diabetes in obese individuals. Indeed, a recent study confirmed earlier findings of reversal of type 2 diabetes.

Advantages & Disadvantages of Intermittent Fasting

Numerous experiments have been performed on humans and animals demonstrating the therapeutic efficacy of the IF diet. It decreases body fat and body mass, which encourages the healthy functioning of the cardiovascular system, and reduces the occurrence of myocardial infarction. Individuals can affect the concentration of several metabolic biomarkers, such as insulin and glucose concentrations, thus reducing the risk of metabolic syndrome. It also decreases the risk of type 2 diabetes. Studies confirm the effect of long- term use of the IF diet on the increase in the viability of individuals. The Intermittent Fasting diet has a beneficial effect on the functioning of the nervous system. By influencing the reduction of free radical formation in the body and stress response systems, it protects neurons against environmental and genetic factors that cause them to age. Intermittent fasting has its disadvantages, too. The fasting times of a few hours at the beginning are causing tremendous problems. This is followed by a poor mood at the beginningof the diet, such as tiredness or dizziness, since the body needs time to get used to using ketones instead of glucose. This is definitely not a healthy diet for patients with reactive hypoglycemia. In addition, caloric restriction with the combined use of anti-diabetic drugs can lead to serious hypoglycemia and even death. Older people are associated with an increased risk of cardiovascular disease, arrhythmia, and stroke. Fluctuations in glucose concentrations cause instability in the body, resulting in increased drops and recurrent fractures due to osteoporosis. The ACCORD research indicated a higher risk of cardiovascular problems during the presence of hypoglycemia in both older and younger individuals. The higher risk of diabetic ketoacidosis is not without significance, especially when there is not enough insulin due to low intake of food during fasting. In addition, the over-restriction of calories contributes to a deregulation of hormonal management. Such disturbances can cause menstrual cycle disorders in women and decreased testosterone in men. Intermittent fasting should not be used by infants, pregnant women and people involved in heavy physical activity.[2]

Types/Methods of Intermittent Fasting

16/8 Method- In this method, we fast for 16 hours, and meals are eaten in an 8-hour nutritional window. In practice, this means that in the morning we leave breakfast, the first meal we eat only at noon, and thelast one at the latest at 08:00 pm.[2]

The 5:2 Diet-In the 5:2 systems, in which caloric restriction is, used for two days a week and a regular diet for 5 days. The literature describes fasting periods as a consumption of about 400–600 kcal/day.[2]

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Alternate Day Fasting- The concept of fasting one day and celebrating another is also seen in the fasting method known as alternate-day fasting. When it comes to this type of fast, there are two camps. The more extreme version is to consume no calories for 24 to 36 hours and then eat whatever you want in your food window the next day.[2]

The Warriors Diet- Another fasting method is referred to as Ori Hofmekler's Warrior Diet, which is simply a time-restricted diet that requires a 20-hour fast with just four hours to consume all yourcalories for the day. While many of the intermittent fasting methods outlined in this post do not specifya particular way of eating, the Warrior Diet focuses on filling whole unprocessed foods. This is meant toimitate the ancient warriors who fasted most of the day and then celebrated the same day for a few hours.[2]

Importance of Food Quality in The Eating Window

Diet plays an important role in cardiovascular disease prophylaxis. Special attention should be paid to nutraceuticals, which contain many beneficial substances to the human body. These compounds, to name a few, are polyphenols, resveratrol, carotenoid, polyunsaturated fatty acids (PUFAs), curcumin, and zinc. Carotenoids are one of the essential ingredients of the Mediterranean diet. They are present in vegetables (especially carrots), fruit and seaweed. Their beneficial effect on the prevention of cardiovascular accidentsis not yet well understood. However, they are related to antioxidant and anti-inflammatory roles due to their effect on lipoxygenases. Resveratrol is a nutraceutical that merits special attention. Its biologically active isomer is Trans 3, 5, 40-trihydroxystylene. Grapes are abundant in resveratrol, which is why the highest concentration is present in red wine, but it is also found in blueberries, peanuts and pistachio. It has antioxidant properties and is helpful in treating many disorders due to its cardio-protective impact. Resveratrol has been shown to raise blood pressure. Wici' nski et al. have shown that a dosage of 10 mg/kgof resveratrol per day raises the concentration of BDNF and decreases the contractility of vascular smooth muscle cells. [2]

III. CONCLUSION

Intermittent fasting, when employed in a structured manner, emerges as a promising strategy for enhancing weight loss and promoting cardiovascular health, particularly in individuals grappling with overweight, obesity, and type 2 diabetes. The attractiveness of this intervention lies in its cost-effectiveness and low-risk profile for adverse reactions. It holds significant potential not only for shedding excess weight but also for mitigating cardiovascular risks associated with conditions like diabetes.

While intermittent fasting showcases effectiveness and clinical benefits, it is crucial to acknowledge its nuanced nature. Tailoring the approach to an individual's lifestyle, profession, and physical activity level becomes paramount. This recognition underscores the importance of a personalized dietary strategy aligned with specific health needs and goals.

The effectiveness of intermittent fasting extends beyond mere weight management. Research consistently highlights its positive impact on diverse health issues, ranging from obesity and diabetes mellitus to cardiovascular diseases, cancers, and neurological disorders. The evidence suggests that adopting intermittent fasting as a lifestyle intervention can yield broad-spectrum benefits across various health domains.

Furthermore, the 8-hour time-limited feeding approach demonstrates its potential as a practical and sustainable method, avoiding the need for meticulous calorie counting. Its ability to induce moderate caloric restriction and subsequent weight loss, coupled with observed benefits such as lowered blood pressure, adds to its clinical utility.

Preclinical and clinical trials have provided substantial support for the broad-ranging advantages of intermittent fasting. While the majority of studies have focused on short-term treatments, the collective findings advocate for the long-term health benefits of this approach. Moreover, the cost-effectiveness and low risk of adverse effects underscore its potential as a viable and accessible intervention for a diverse range of individuals.

In conclusion, intermittent fasting stands at the intersection of weight management, metabolic health improvement, and overall well-being. As we navigate the intricacies of individual health goals and lifestyles, intermittent fasting emerges as a compelling avenue for those seeking a holistic and sustainable approach to health improvement.

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