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Current Diet Practice: Intermittent Fasting

ABSTRACT
Obesity is defined as a condition characterized by abnormal or excessive fat accumulation that poses a risk to health. Various behavioral changes include current dietary practices. One of the contemporary dietary approaches, intermittent fasting. Intermittent fasting refers to the cycle between periods of eating and fasting. This review article aims to examine the potential effects of intermittent fasting on health. The study included randomized controlled trials (RCTs) conducted between 2013 and 2024. In the study, a total of 20 different articles were included, examining 1667 participants. Intermittent fasting holds promise for the management and alleviation of symptoms of various non-communicable diseases such as obesity, type-2 diabetes, and metabolic syndrome. While current research suggests that intermittent fasting has beneficial effects on human health, including improved metabolic health and weight management, more clinical studies are needed to better understand this interaction.
Keywords: Diet, intermittent fasting, nutrition, , obesity, type-2 diabetes.

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Introduction

Obesity is defined as an abnormal or excessive accumulation of body fat that poses a health risk. It affects more than 890 million people worldwide and is the most common chronic disease (WHO, 2025). In 2022, 2.5 billion people struggled with obesity. By 2025, one in five people are expected to be obese (Blüher, 2019; WHO, 2024). Obesity contributes to cardiovascular disease, type 2 diabetes, kidney disease, certain types of cancer, and musculoskeletal disease (Blüher, 2019; Heymsfield & Wadden, 2017). The excess adipose tissue found in obesity disrupts the balance of adipokines and cytokines, which play a metabolically active role. Similarly, high adipose tissue activates cancer signaling pathways, such as PI3K, MAPK, IKK, and STAT3 (Akil & Ahmad, 2011; Powell-Wiley et al., 2021). Various strategies have been implemented to address the growing global obesity epidemic (WHO, 2024). These include dietary changes, medications, and bariatric surgery. Bariatric surgery is reported to be the most effective method, resulting in an average weight loss of 25-30%. Glucagon-like peptide-1 (GLP-1) agonists reduce body weight by an average of 18-21%. Behavioral interventions provide an average 5-10% reduction in body weight (Roomy et al., 2024). Although bariatric surgery is the most effective method, it is also the most invasive and is associated with more complications. In contrast, lifestyle and dietary changes are the safest and least invasive alternatives. Current dietary practices are among the various behavioral modifications. One such approach is intermittent fasting, which may significantly impact weight loss and could be employed in the fight against obesity (Varady et al., 2022). This review article examines the possible health effects of intermittent fasting.

Intermittent Fasting Practice

Intermittent fasting (IF) involves cycling between eating and fasting periods (Stockman et al., 2018). There are several methods of IF with different durations according to the eating and fasting windows. The most common method is time-restricted feeding, in which individuals fast for 16–18 hours during the day and eat for 6–8 hours. Alternate day fasting (ADF), in contrast, is a type of IF in which individuals alternate between restricted eating days and normal eating days. On fasting days, caloric intake is limited to 25% of normal intake, and normal eating habits resume the following day (Malinowski et al., 2019). In recent years, IF has emerged as a potential strategy for preventing and treating obesity and cardiovascular diseases. It has been shown to improve lipid profiles, trigger a metabolic transition resulting in weight loss, and alter mitochondrial and oxidative dynamics within cells. Ultimately, these changes contribute to cardioprotection and longevity (Diab et al., 2024).

Methods

Relevant articles were thoroughly searched in electronic databases such as PubMed and Google Scholar. The search terms used included 'Fasting,' 'Diets,' 'Intermediate,' and combinations of these terms. Filters were applied to include studies published from the inception of the databases to the present. Descriptive studies, letters to the editor, book chapters, conference proceedings, literature reviews, narratives, systematic reviews with and without meta-analysis, as well as nutritional co-intervention studies, were excluded (Figure 1). The study is not a research article, so there is no ethics committee file. Throughout the study, the ethical principles of the Helsinki Declaration were followed.

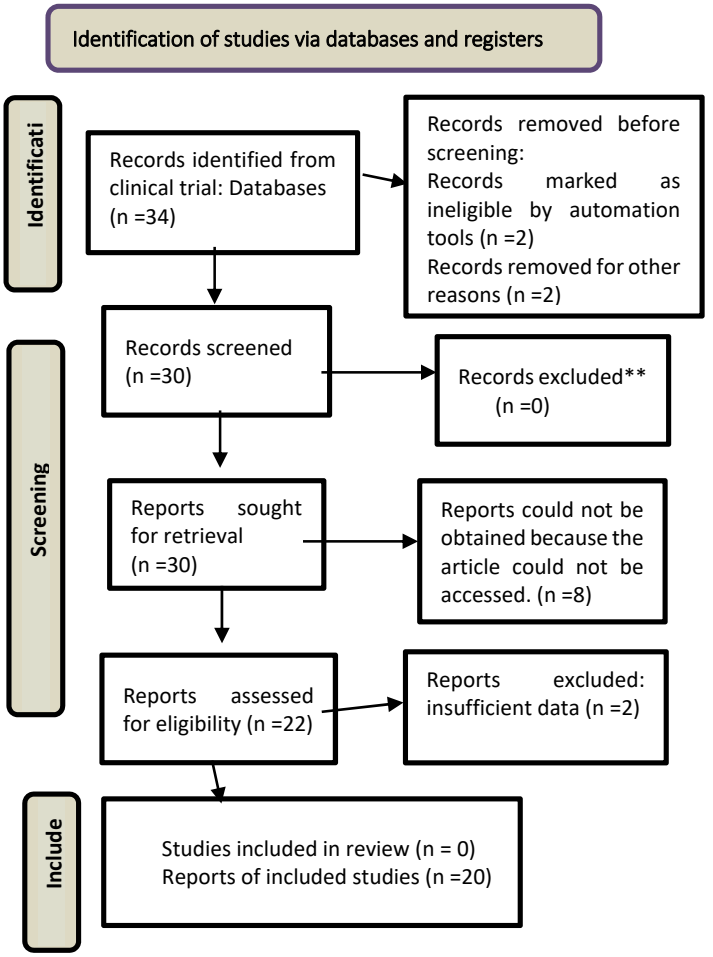

Figure 1.

PRISMA flow diagram of article selection

The effectiveness of dietary practices on diseases

Table 1 shows the effectiveness of different dietary practices on diseases.

Table 1.
Different Dietary Practices on Diseases

Participants	Number (Person)	Age	Gender	Duration	Study design, level of evidence	Dietary practice	Data collection time	Outcome	Adverse Effects	Reference
Overweight or Obese	Total: 101 Control: 34 ADF: 34 TRF: 33	18-65	Female: 64 Male: 37	3 weeks	RCT/II	ADF Group:600 kcal, TRF:16/8	T0: Baseline, T1: End of intervention, T2: 3-month follow-up	Significant reduction in body weight (-4.44-14.8kg) Significant reduction in body mass index (-2.1-2.15 kg/m^2) Significant reduction in waist circumference (-5.54-8.64cm) Decrease in blood glucose and triglyceride levels Increase in blood HDL level (0.35-0.4 mg/dl) 16/8 group: Significant BMI and weight loss T1 and T2: ADF group showed significant reduction in weight and BMI compared to the 16/8 group T1 and T2: ADF group showed a decrease in fasting blood glucose T2: 16/8 group showed a significant decrease in fasting blood glucose Improvement in HDL-C levels in the ADF group T2: 16/8 TRF group showed a significant improvement in HDL-C Improvement in LDL-C levels T1: ADF group showed a significant decrease in total cholesterol levels T1 and T2: 16/8 TRF group showed a decrease in triglycerides compared to T0 ADF is less effective than 16/8 TRF in reducing blood triglyceride levels	No severe adverse events	(Chair et al., 2022)
Type-2 Diabetes	Total: 46 Control: 24 Diet: 22	18-75	Female: 22 Male: 24	12 weeks	RCT/II	16/8, 75% energy restriction	T0: Baseline, T1: End of intervention	Serum HbA1c level decrease (7.3 ± 12.0 mmol/mol) Weight loss (4.77 ± 4.99 kg) Decrease in fat mass (3.5 ± 3.3 kg) No significant difference in resting metabolic rate T1: Decrease in insulin dosage Control group: Increase in insulin amount after 12 weeks Significant difference in perceived health change (euroqol-5D) Intermittent fasting group: Higher detection of acetic acid, dimethylsulfone, and some ketone bodies Adverse effect: Hypoglycemia	No adverse events	(Obermayer et al., 2023)

Metabolic Syndrome	Total: 39 Diet:21 Control: 18	30-50	N.M.	8 weeks	RCT/II	2 non-consecutive days a week: 75% energy restriction & 5 days: Discretionary dietary consumption	T0: Baseline, T1: End of intervention	Weight loss (3.5 ± 1.5kg) Decrease in BMI (1.3 kg/m^2) Decrease in fat mass (2.4 ± 1.6kg) Decrease in HOMA-IR (0.75 (1.20 to 0.17)) Improvement in oxidative stress levels Modulation of inflammatory cytokines Improvement in vasodilator parameters Decrease in circulating lipopolysaccharide levels No change in IL-6 and TNF-alpha levels Significant improvement in adipokine secretion Improvement in leptin and adiponectin levels Decrease in plasma MDA levels (7,35 nmol/mL) No difference in oxidized LDL levels 275.1% increase in plasma total nitrate levels Increase in short-chain fatty acid concentration in gut microbiota Dominant bacterial species: Firmicutes and Bacteroidetes	No adverse events	(Guo et al., 2021)
Metabolic Syndrome & BMI>27	Total: 65 Control:33 Diet: 32	18-65	Male: 31 Female: 34	12 weeks	RCT/II	16/8, 25% energy restriction	T0: Baseline, T1: End of intervention	8% weight loss Decrease in body fat (5.5kg) Improvement in body fat percentage Improvement in total body water and waist/hip ratio (-0,04) Improvement in lean body mass (1.75-2.71kg) Improvement in body mass index (3.06kg/m^2) Improvement in HDL cholesterol (0.38-0.53 mg/dL) Improvement in systolic and diastolic blood pressure Improvement in LDL cholesterol (15,97-17mg/dL) Improvement in total cholesterol (29.32-29.36 mg/dL) Improvement in triglycerides (40-41.84mg/dL) Improvement in fasting glucose (13.12-15.47mg/dL) Improvement in HOMA-IR, and HbA1c values	N.S.	(Kunduraci & Ozbek, 2020)
BMI>27,5 kg/m^2	Total: 20	30-65	Male: 6 Female: 14	5 weeks	RCT/II	F1-P: 1 day per week Female: 1350 kcal/day & Male: 1700 kcal/day or IF2-P: Alternating 2	T0: Baseline, T1: End of intervention	Decrease in body weight (5.2% - 7%) Reduction in waist circumference (38%) Decrease in blood pressure total cholesterol (16%-17%) Decrease in LDL cholesterol (10%-14%) Decrease in triglyceride levels (11%-21%) Decreased appetite (by 44%) and food intake (by 30%) Decrease in hunger tendency	N.S.	(Arciero et al., 2022)

						days Female: 1500 kcal/day & Male: 1800 kcal/day (35% protein, 35% carbohydrate, and 30% fat)				
Type-2 Diabetes	Total: 209	35-75	Male: 90 Female: 119	18 months	RCT/II	In three non-consecutive days per week, 20 hours of fasting with 30% energy restriction	6 months intervention & 12-month follow-up	Improvement in postprandial glucose levels starting from the 6th month Decrease in fasting nonesterified fatty acids and triglyceride levels at 2nd and 6th months Lower C-reactive protein (CRP) levels compared to standard care at 2nd and 6th months in the intermittent fasting with time-restricted eating (iTRE) group No significant difference observed in postprandial triglyceride levels between groups Reduction in serum cholesterol/HDL ratio No difference in serum ALT or AST levels	Back pain, Flu-like symptoms	(Teong et al., 2023)
BMI: 27-35 kg/m^2	Total: 228 MD: 71 WOWO: 65 TRE-6: 70 TRE-8: 66 ADD: 56	18-65	Male: 227 Female: 101	13 weeks	RCT/II	Mediterranean Diet (MD), Week on Week off (WOWO), 6-Hour Time-Restricted Eating (TRE-6), 8-Hour Time-Restricted Eating (TRE-8), Alternative Day Diet (ADD),	1st, 6th, and 12th weeks	Decrease in BMI (2.38-2.52 kg/m^2) Decrease in weight Decrease in arm circumference (3.76-4.15cm) Decrease in waist circumference (9.17-10.65cm) Decrease in hip circumference (7,3-7,51cm) No significant difference observed in body weight change trend between groups No changes in energy, carbohydrate, protein, and fat intake Increase in fiber consumption in MD and WOWO groups.	N.S.	(Erdem et al., 2022)

BMI: 30–45 kg/m^2 & Type-2 Diabetes	Total: 41 Control:19, Diet: 22	>18	N.M.	12 weeks	RCT/II	Two small snacks ranging from 2092 to 2510 kJ per day, and one light meal Men are allowed approximately 400 kJ more than women.	T0: Baseline, T1: End of intervention	Weight control (-4,2kg) Decrease in body fat (1,1%) Decrease in waist circumference (1.6cm) Improvement in serum HbA1c levels (-4mmol/mol) Improvement in fasting blood sugar levels (-1.3mmol/l) Improvement in quality of life Increase in HDL cholesterol level (0.1mmol/l) Decrease in LDL cholesterol level(0.1mmol/l) Decrease in triglycerides level (0.1mmol/l)	Hypoglycemia	(Corley et al., 2018)
Obese	Total: 10	> 65	Male: 4 Female: 6	40 weeks	RCT/II	16/8	T0: Baseline, T1: End of intervention	Weight control (-1.35kg) Decrease in Body Mass Index (BMI) (0,9kg/m^2) Decrease in waist circumference (0.2cm) Decrease in blood glucose (1.7mg/dL) Change in walking speed Improvement in quality of life.	Headaches Dizziness	(Anton et al., 2019)
Overweight & Obese (BMI>25 kg/m^2)	Total: 27	18-65	Male: 13 Female: 14	Until achieving a 5% weight loss	RCT/II	Approximately 25 % of their estimated euenergetic needs	N.A	Groups achieved similar timeframes for achieving 5% weight loss. No change in glycemia. Decrease in insulinemia. Decrease in C-peptide.	N.S.	(Antoni et al., 2018)
Obese & Type-2 Diabetes	Total: 10	18-65	Male: 1 Female: 9	6 weeks	RCT/II	1st and 2nd weeks: Normal eating pattern (breakfast, lunch, and dinner) 3rd and 4th weeks: 18-20 hours of fasting with coffee, tea, and water consumption	T0: Baseline, T1: End of intervention, T2: 2-week follow-up	Decrease in weight (1.395 kg) Decrease in BMI (0.517 kg/m^2) Decrease in morning glucose Decrease in waist circumference (2.1cm) Postprandial SMBG improvement No improvement in insulin resistance (HOMA-IR) No improvement in inflammatory markers (C-reactive protein) Caloric intake reduction Decrease in energy, carbohydrate, and fat intake Increase in IPAQ score at T1, decrease at T2	N.S.	(Arnason et al., 2017)

						allowed, 1/3 plate of protein consumption				
Obese (BMI:30-39.99 kg/m^2)	Total: 83 Control:16 Exercise: 24 Diet: 25 Combination:18	25-65	Male: 3 Female: 80	12 weeks	RCT/II	4-weeks controlled feeding period, 8-week self-selected feeding period, Controlled feeding period (weeks 1-4): Energy intake restricted by 25%, Feeding days: Unlimited food consumption	T1: End of intervention	Decrease in body weight (6 ± 4 kg) Reduction in fat mass and waist circumference No change in lean mass Decrease in LDL cholesterol levels (4-6 mg/dL) Increase in HDL levels (2±3mg/dL) Decrease in Triglycerides levels (9-13 mg/dL)	N.S.	(Bhutani et al., 2013)
Overweight & Obese (BMI>27 kg/m^2)	Total: 163	25-66	Male: 31 Female: 132	16 weeks	Randomized Open-label/II	3 days fast, 3 days CR & 1day adlibitum intake, CR: 8 weeks maintenance	T0: Baseline, T1: End of intervention	Weight loss (11.2 ± 0.6 kg) Reduction in fat mass and visceral fat percentage Improvement in LDL cholesterol levels Improvement in triglyceride levels Improvement in insulin levels Improvement in hsCRP, blood glucose, and blood pressure Improvement in transferrin saturation, ferritin, serum zinc, folate, and B12 levels Improved desire to eat, quality of life and mood	Decrease in plasma thiamine, Decrease in vitamin D levels	(Bowen et al., 2018)
Obese & Type-2 Diabetes (BMI⩾27	Total: 51	⩾18	Male: 30 Female: 33	12 weeks	RCT/II	2 days fast: 1670- 2500 kJ/day & 5 days usual diet,	T0: Baseline, T1: End of intervention	12th week: Decrease in HbA1c levels and body weight Reduction in medication dosage Decrease in body composition measurements Decrease in appetite Decrease in weight (-5.9±4%)	No adverse events	(Carter et al., 2016)

kg/m^2)						CR				
Obese & Type-2 Diabetes (BMI⩾27 kg/m^2)	Total: 137 Intermittent fasting: 70 Continuous group: 67	>18	Male: 60 Female: 77	52 weeks	RCT/II	Intermittent fasting group: Two non-consecutive days per week (500-600 kcal/day) & Normal diet for 5 days per week, Continuous group: Consistently 7 days per week (1200-1500 kcal/day)	T1: End of intervention	Increasing serum HbA1c levels (0.7±0.9%) Weight loss (5.9±4%) 24 months: Decrease in body composition, improvement in fasting glucose levels 24 months: Decrease in serum lipid levels 24 months: No difference between groups in total drug effect score 3.9kg weight loss	N.S.	(Carter et al., 2019)
Overweight & Obese (BMI:>23 kg/m^2)	Total: 31	20-65	Male: 15 Female: 16	8 weeks	RCT/II	8-week intervention: Fasting days consumed 25% of recommended energy (500 kcal/day) & Unlimited food intake on non-fasting days, Fasting days: 3 days per week	T1: End of intervention	Exercise group: Decrease in desmosterol levels. Exercise group: Decrease in cholesterol esters. Exercise group: Decrease in oxysterol levels. Physical activity level reflects desmosterol and 7-dehydrocholesterol, which are indicators of cholesterol biosynthesis and are inversely correlated with cholesterol.	N.S.	(Cho et al., 2019)
Obese (30 <BMI< 40 kg/m^2)	Total: 28	18-65	Male: 6 Female: 22	N.M..	RCT/II	3 days fast (25% of caloric needs) and 4 day full	T0: Baseline, T1: End of intervention	Both groups experienced similar weight loss Fasting RQ and ExEff increased in both groups at 10 W 3-day fasting group: Decrease in RMR No difference in appetite	N.S.	(Coutinho et al., 2018)

						caloric needs, CR				
Obese (30 <BMI< 45 kg/m^2)	Total: 46	25-65	N.M.	12 weeks	RCT/II	Baseline: 12 weeks, TRF: 12 weeks (16/8), water and calorie-free beverages allowed	T0: Baseline, T1: Week 3 T2: Week 12	2.6 ± 0.5% weight loss after 12 weeks No difference in eating disorder symptoms No difference in body image perception No difference in blood values	N.S.	(Gabel et al., 2019)
Obese (BMI≥27 kg/m^2)	Total: 244	⩾18	Male: 56 Female: 276	52 weeks	RCT/II	2 days fast (25% of calorie intake) and 5 days usual diet, CR	T0: Baseline, T1: End of intervention	Weight loss (6.6kg) No difference between groups Increase in HDL cholesterol (7%) Decrease in triglycerides (13%) No change in fasting blood glucose and LDL cholesterol	N.S.	(Headland et al., 2019)
Overweight, Obese & Women	Total: 88	18-65	Female: 88	8 weeks	RCT/II	3 days fast (32%–37% of energy requirements) and 4 days at 100% or 145% of energy requirements , CR and Control group	T1: End of intervention	Weight loss (~5kg) Reduction in fat mass (~4kg) Decrease in total and low-density lipoprotein levels Decrease in cholesterol and non-esterified fatty acids Decrease in 24-hour fasting transient insulin sensitivity	Increase in fasting insulin	(Hutchison et al., 2019)

N.M. = not mention, N.S. = not specified

Effect on Obesity

In a three-week study conducted by Chair et al. on 101 obese and overweight individuals aged 18–65 years, significant decreases in body weight, body mass index, and waist circumference were observed, as well as decreases in blood glucose, triglyceride, and total cholesterol levels, and improvements in serum HDL-C and LDL-C levels, as a result of dietary intervention. Additionally, alternate-day fasting (ADF) was less effective than 16/8 time-restricted feeding (TRF) in lowering blood triglyceride levels (Chair et al., 2022). In a different study, Arciero et al. targeted obese individuals aged 30–65 years. The study observed a decrease in body weight, waist circumference, blood pressure, total cholesterol, LDL cholesterol, and triglyceride levels as a result of the IF-1 or IF-2 diet. Additionally, the participants' desire to eat decreased, as did the amount of food they consumed and their tendency to feel hungry (Arciero et al., 2022). In a similar study, Erdem et al. targeted 228 individuals with a BMI of 27–35kg/m². Five different diets were administered to the groups: MD, WOWO, TRE-6, TRE-8, and ADD. By the thirteenth week of the dietary intervention, participants in the MD and WOWO diet groups reported decreased BMI, weight, and arm and waist circumferences, as well as increased fiber consumption. Additionally, no change in energy, carbohydrate, protein, or fat intake was observed among the diet groups (Erdem et al., 2022). Another study targeting 41 individuals with a BMI between 35 and 45 kg/m² reported that participants achieved weight control and improvements in serum HbA1c levels, fasting blood glucose levels, and quality of life. Additionally, some participants experienced hypoglycemic side effects while on the diet (Corley et al., 2018). In a different study, Anton et al. reported that weight control, changes in walking speed, and improvements in quality of life were achieved in participants who fasted for 16 hours and fed for 8 hours (16/8). Another study targeted 27 adults aged 18-65.

The study found that the groups had a similar time to reach 5% weight loss and that there was no change in glycosemia .A decrease in insulinemia and C-peptide values was also observed (Anton et al., 2018). A study in which participants fasted for 18-20 hours for six weeks found that there was no improvement in postprandial SMBG values, HOMA-IR values, or C-reactive protein levels. Additionally, a decrease in daily calorie, energy, carbohydrate, and fat intake was observed. The participants' physical activity scores increased during the T1 period and decreased during the T2 period (Arnason et al., 2017). In a 12-week study of 83 individuals with a BMI between 30 and 40, calorie restriction for four weeks resulted in decreased body weight, fat mass, and waist circumference; no difference was observed in lean muscle mass, and serum LDL cholesterol decreased while HDL increased (Bhutani et al., 2013). A study involving three-day fasting reported a decrease in serum HbA1c values, the desire to eat, body weight, drug dosage, and body composition measurements after 16 weeks (Carter et al., 2016). In a different study, Carter et al. compared groups with calorie restriction two days a week and every day. As a result of the study, participants reported increased serum HbA1c levels, weight loss, improved fasting blood glucose levels, and decreased serum lipid levels. However, there was no difference in the total drug effect score (Carter et al., 2019). In a study by Cho et al. on obese individuals, desmosterol, cholesterol ester, and oxysterol levels decreased in the exercise group as a result of restricting 75% of their daily energy intake. Additionally, desmosterol and 7-dehydrocholesterol levels, which reflect physical activity and cholesterol biosynthesis, were inversely related to cholesterol levels (Cho et al., 2019). Different studies with energy restriction observed weight loss; a decrease in resting metabolic rate (RMR); an increase in serum high-density lipoprotein (HDL)-cholesterol; a decrease in serum triglyceride, total cholesterol, and low-density lipoprotein (LDL)-cholesterol levels; a decrease in body fat mass; and a decrease in 24-hour fasting transient insulin sensitivity (Coutinho et al., 2018; Gabel et al., 2019; Headland et al., 2019; Hutchison et al., 2019). Hutchison et al. reported an increase in fasting insulin levels as a side effect.

Effect on Type-2 Diabetes

A study by Obermayer et al. examined 46 individuals with diabetes for 12 weeks with 75% energy restriction. The results showed a decrease in serum HbA1c values, weight, fat mass, and insulin dose. Additionally, higher levels of acetic acid, dimethyl sulfone, and some ketone bodies were detected in the diet groups. Hypoglycemia was reported as a side effect during the dietary intervention (Obermayer et al., 2023). In a different study, Teong et al. examined 209 individuals with diabetes and reported that postprandial glucose levels improved and the serum cholesterol/HDL ratio decreased as a result of a six-month dietary intervention. They also reported decreased fasting nonesterified fatty acid and triglyceride levels from the second month of the diet (Teong et al., 2023). A study targeting 41 individuals with diabetes and a BMI between 35 and 45 kg/m² reported that participants achieved weight control and improvements in serum HbA1c levels, fasting blood glucose levels, and quality of life. Additionally, some participants experienced hypoglycemic side effects during the diet (Corley et al., 2018). A different study in which participants fasted for 18-20 hours for six weeks reported no

improvement in postprandial SMBG values, HOMA-IR values, or C-reactive protein levels. Additionally, a decrease in daily calorie, energy, carbohydrate, and fat intake was observed. The participants' physical activity scores increased during the T1 period and decreased during the T2 period (Arnason et al., 2017). A study of obese diabetic individuals who fasted for three days reported a decrease in serum HbA1c values, the desire to eat, body weight, medication dosages, and body composition measurements after 16 weeks (Carter et al., 2016). In a similar study, Carter et al. compared groups of individuals with diabetes who restricted calories two days a week and those who restricted calories every day. The participants reported an increase in serum HbA1c levels, weight loss, an improvement in fasting blood glucose levels, and a decrease in serum lipid levels (Carter et al., 2019).

Effect on Metabolic Syndrome

In a study by Guo et al., 39 individuals diagnosed with metabolic syndrome (aged 30-50 years) participated for eight weeks. The results showed that, after two days of 75% energy restriction per week, participants experienced decreased body fat mass, improved oxidative stress levels, modulated inflammatory cytokine levels, improved vasodilator parameters, decreased circulating lipopolysaccharide levels, significant improvements in adipokine release, decreased plasma MDA levels, and increased plasma total nitrate levels. Additionally, leptin and adiponectin levels improved (Guo et al., 2021). In a study by Kunduracı and Özbek, 25% energy restriction over 12 weeks resulted in 8% weight loss and decreased body fat mass and percentage. There was also an improvement in lean body mass, total body water, body mass index, and waist-to-hip ratio, as well as an improvement in systolic and diastolic blood pressure, serum LDL cholesterol, total cholesterol, fasting blood glucose, HOMA-IR, and serum HbA1c values (Kunduracı & Özbek, 2020).

Effect of Diet on Gut

In a study by Cuo et al., 39 individuals diagnosed with metabolic syndrome and aged 30-50 years were observed for eight weeks. The researchers reported an increase in short-chain fatty acid concentration in the participants' gut microbiota as a result of 75% energy restriction for two days a week. Additionally, the dominant bacterial strains were Firmicutes and Bacteroidetes (Guo et al., 2021).

Effect of Diet on Physical Activity

Obese individuals with type 2 diabetes who fasted for 18-20 hours for six weeks had increased IPAQ scores. However, a decrease in IPAQ scores was reported during the two-week period following the dietary intervention (Arnason et al., 2017).

Side Effects of Diet

Different studies have reported side effects such as hypoglycemia, decreased plasma thiamine and vitamin D levels, and increased fasting insulin secretion (Bowen et al., 2018; Corley et al., 2018; Hutchison et al., 2019; Obermayer et al., 2023).

Sustainability

When the studies are examined, the intermittent fasting diet provides an advantage to individuals because it is simple and easy to apply. In addition, the fact that calorie restriction is in the second plan rather than different diets and the main important point is to adjust the meal time provides an advantage in terms of sustainability. Especially the 16:8 model can be easily integrated into social life.

Conclusion and Recommendations

Intermittent fasting shows promise in managing various non-communicable diseases, such as obesity, type 2 diabetes, and metabolic syndrome. Additionally, it shows potential in improving gut microbiota composition and weight control. Different intermittent fasting methods can affect blood lipid profiles, weight, blood pressure, diabetes, and gut microbiota in various ways. Furthermore, new applications can be developed by combining intermittent fasting with different diets. For instance, the 16/8 intermittent fasting regimen can be combined with the Mediterranean diet during the eating window. While current research suggests that intermittent fasting has beneficial effects on human health, including improved metabolic health and weight management, more clinical studies are needed to better understand this interaction.

Declaration of conflict of interest

The authors declare that no potential conflict of interest with respect to the research, authorship or publication of this article.

Ethics Committee Approval:
Ethics committee approval is not required for this study.
Peer-review: Externally peer-reviewed.
Author Contributions: Concept - İHÇ; Design - İHÇ; Supervision - İHÇ; Resources - İHÇ; Data Collection and/or Processing - İHÇ; Analysis and/or Interpretation - İHÇ; Literature Search - İHÇ; Writing Manuscript - İHÇ; Critical Review – İHÇ.
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References

Anton, S. D., Lee, S. A., Donahoo, W. T., McLaren, C., Manini, T., Leeuwenburgh, C., & Pahor, M. (2019). The Effects of Time Restricted Feeding on Overweight, Older Adults: A Pilot Study. *Nutrients*, *11*(7), 1500. https://doi.org/10.3390/nu11071500

Antoni, R., Johnston, K. L., Collins, A. L., & Robertson, M. D. (2018). Intermittent v . continuous energy restriction: differential effects on postprandial glucose and lipid metabolism following matched weight loss in overweight/obese participants. *British Journal of Nutrition*, *119*(5), 507–516. https://doi.org/10.1017/S0007114517003890

Arciero, P. J., Arciero, K. M., Poe, M., Mohr, A. E., Ives, S. J., Arciero, A., Boyce, M., Zhang, J., Haas, M., Valdez, E., Corbet, D., Judd, K., Smith, A., Furlong, O., Wahler, M., & Gumpricht, E. (2022). Intermittent fasting two days versus one day per week, matched for total energy intake and expenditure, increases weight loss in overweight/obese men and women. *Nutrition Journal*, *21*(1), 36. https://doi.org/10.1186/s12937-022-00790-0

Arnason, T. G., Bowen, M. W., & Mansell, K. D. (2017). Effects of intermittent fasting on health markers in those with type 2 diabetes: A pilot study. *World Journal of Diabetes*, *8*(4), 154. https://doi.org/10.4239/wjd.v8.i4.154

Bhutani, S., Klempel, M. C., Kroeger, C. M., Trepanowski, J. F., & Varady, K. A. (2013). Alternate day fasting and endurance exercise combine to reduce body weight and favorably alter plasma lipids in obese humans. *Obesity*, *21*(7), 1370–1379. https://doi.org/10.1002/oby.20353

Bowen, J., Brindal, E., James-Martin, G., & Noakes, M. (2018). Randomized Trial of a High Protein, Partial Meal Replacement Program with or without Alternate Day Fasting: Similar Effects on Weight Loss, Retention Status, Nutritional, Metabolic, and Behavioral Outcomes. *Nutrients*, *10*(9), 1145. https://doi.org/10.3390/nu10091145

Carter, S., Clifton, P. M., & Keogh, J. B. (2016). The effects of intermittent compared to continuous energy restriction on glycaemic control in type 2 diabetes; a pragmatic pilot trial. *Diabetes Research and Clinical Practice*, *122*, 106–112. https://doi.org/10.1016/j.diabres.2016.10.010

Carter, S., Clifton, P. M., & Keogh, J. B. (2019). The effect of intermittent compared with continuous energy restriction on glycaemic control in patients with type 2 diabetes: 24-month follow-up of a randomised noninferiority trial. *Diabetes Research and Clinical Practice*, *151*, 11–19. https://doi.org/10.1016/j.diabres.2019.03.022

Chair, S. Y., Cai, H., Cao, X., Qin, Y., Cheng, H. Y., & Ng, M. T. (2022). Intermittent Fasting in Weight Loss and Cardiometabolic Risk Reduction: A Randomized Controlled Trial. *Journal of Nursing Research*, *30*(1), e185. https://doi.org/10.1097/jnr.0000000000000469

Cho, A.-R., Moon, J.-Y., Kim, S., An, K.-Y., Oh, M., Jeon, J. Y., Jung, D.-H., Choi, M. H., & Lee, J.-W. (2019). Effects of alternate day fasting and exercise on cholesterol metabolism in overweight or obese adults: A pilot randomized controlled trial. *Metabolism*, *93*, 52–60. https://doi.org/10.1016/j.metabol.2019.01.002

Corley, B. T., Carroll, R. W., Hall, R. M., Weatherall, M., Parry-Strong, A., & Krebs, J. D. (2018). Intermittent fasting in Type 2 diabetes mellitus and the risk of hypoglycaemia: a randomized controlled trial. *Diabetic Medicine*, *35*(5), 588–594. https://doi.org/10.1111/dme.13595

Coutinho, S. R., Halset, E. H., Gåsbakk, S., Rehfeld, J. F., Kulseng, B., Truby, H., & Martins, C. (2018). Compensatory mechanisms activated with intermittent energy restriction: A randomized control trial. *Clinical Nutrition*, *37*(3), 815–823. https://doi.org/10.1016/j.clnu.2017.04.002

Erdem, N. Z., Bayraktaroğlu, E., Samancı, R. A., Geçgil-Demir, E., Tarakçı, N. G., & Mert-Biberoğlu, F. (2022). The effect of intermittent fasting diets on body weight and composition. *Clinical Nutrition ESPEN*, *51*, 207–214. https://doi.org/10.1016/j.clnesp.2022.08.030

Gabel, K., Hoddy, K. K., & Varady, K. A. (2019). Safety of 8-h time restricted feeding in adults with obesity. *Applied Physiology, Nutrition, and Metabolism*, *44*(1), 107–109. https://doi.org/10.1139/apnm-2018-0389

Guo, Y., Luo, S., Ye, Y., Yin, S., Fan, J., & Xia, M. (2021). Intermittent Fasting Improves Cardiometabolic Risk Factors and Alters Gut Microbiota in Metabolic Syndrome Patients. *The Journal of Clinical Endocrinology & Metabolism*, *106*(1), 64–79. https://doi.org/10.1210/clinem/dgaa644

Headland, M. L., Clifton, P. M., & Keogh, J. B. (2019). Effect of intermittent compared to continuous energy restriction on weight loss and weight maintenance after 12 months in healthy overweight or obese adults. *International Journal of Obesity*, *43*(10), 2028–2036. https://doi.org/10.1038/s41366-018-0247-2

Hutchison, A. T., Liu, B., Wood, R. E., Vincent, A. D., Thompson, C. H., O'Callaghan, N. J., Wittert, G. A., & Heilbronn, L. K. (2019). Effects of Intermittent Versus Continuous Energy Intakes on Insulin Sensitivity and Metabolic Risk in Women with Overweight. *Obesity*, *27*(1), 50–58. https://doi.org/10.1002/oby.22345

Kunduraci, Y. E., & Ozbek, H. (2020). Does the Energy Restriction Intermittent Fasting Diet Alleviate Metabolic Syndrome Biomarkers? A Randomized Controlled Trial. *Nutrients*, *12*(10), 3213. https://doi.org/10.3390/nu12103213

Obermayer, A., Tripolt, N. J., Pferschy, P. N., Kojzar, H., Aziz, F., Müller, A., Schauer, M., Oulhaj, A., Aberer, F., Sourij, C., Habisch, H., Madl, T., Pieber, T., Obermayer-Pietsch, B., Stadlbauer, V., & Sourij, H. (2023). Efficacy and Safety of Intermittent Fasting in People With Insulin-Treated Type 2 Diabetes (INTERFAST-2)—A Randomized Controlled Trial. *Diabetes Care*, *46*(2), 463–468. https://doi.org/10.2337/dc22-1622

Teong, X. T., Liu, K., Vincent, A. D., Bensalem, J., Liu, B., Hattersley, K. J., Zhao, L., Feinle-Bisset, C., Sargeant, T. J., Wittert, G. A., Hutchison, A. T., & Heilbronn, L. K. (2023). Intermittent fasting plus early time-restricted eating versus calorie restriction and standard care in adults at risk of type 2 diabetes: a randomized controlled trial. *Nature Medicine*, *29*(4), 963–972. https://doi.org/10.1038/s41591-023-02287-7