

THE EFFECT OF FASTING DIETS (INTERMITTENT FASTING) ON CHANGES IN BODY WEIGHT AND BODY MASS INDEX (BMI)

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Abstrak

Intermittent fasting (IF) is gaining popularity as a non-pharmacological intervention for weight loss and the improvement of cardiometabolic profiles. This study aimed to determine the effect of intermittent fasting on changes in body weight and Body Mass Index (BMI) among students at Muhadi Setiabudi University. A pre-experimental design with a one-group pretest-posttest approach was employed. The study sample consisted of 40 respondents whose body weight and BMI were measured before and after the intervention. Data were analyzed using the Paired Sample T-Test. The results showed a decrease in the respondents' mean body weight from 49.31 kg to 48.26 kg and a decrease in mean BMI from 20.85 to 20.40. Bivariate analysis revealed a significance value of 0.000 ($p < 0.05$) for both variables, demonstrating a significant effect of intermittent fasting on reductions in body weight and BMI. The study concludes that intermittent fasting influences changes in the students' body weight and BMI.

Keywords: Body mass index, Body weight, Intermittent fasting, Obesity, University students

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1. Introduction

Overnutrition and obesity have become significant global health challenges, directly contributing to an increased risk of cardiometabolic syndrome-related conditions such as insulin resistance, dyslipidemia, type 2 diabetes mellitus, and hypertension [1][2]. Obesity is caused by the excessive accumulation of fat resulting from an imbalance between energy intake and energy expenditure over a prolonged period [3]. In Indonesia, the prevalence of obesity among adults continues to show an alarming upward trend year after year [4]. Lifestyle transitions among young adults or university students such as high consumption of calorie-dense

foods, a lack of physical activity (sedentary lifestyle), and the burden of academic stress place them at high risk of weight gain and a Body Mass Index (BMI) exceeding the normal range [5]. Furthermore, weight gain is often accompanied by a rise in blood pressure, which poses a threat to cardiovascular health if not addressed promptly [6][7].

As a strategy for managing obesity and improving cardiometabolic profiles, the intermittent fasting (IF) approach has emerged as a highly promising non-pharmacological intervention [1]. Biologically, intermittent fasting triggers a metabolic switch shifting from glucose utilization to free fatty acid oxidation or ketogenesis which effectively burns fat

stores, reduces body weight, and optimizes energy without drastically sacrificing muscle mass, provided it is done correctly [8]. Furthermore, the state of fasting induces autophagy a mechanism for clearing out and recycling damaged cellular components which has been shown to detoxify the body and significantly boost human immunity [9].

Various literature reviews and clinical trials have demonstrated that the practice of intermittent fasting whether through time-restricted eating (TRE), alternate-day fasting (ADF), the 5:2 diet, or modified voluntary fasts (such as Ramadan, the Fast of David, and the Monday-Thursday fast) yields a range of positive health effects [10][11][12]. This fasting-based intervention has been proven effective in lowering systolic and diastolic blood pressure [7], improving lipid profiles and lowering blood glucose levels in in vivo tests [11][13], reduces oxidative stress markers such as malondialdehyde (MDA) [14] and is capable of improving the synchronization of sleep timing with the body's circadian rhythm [15]. Dietary practices combining carbohydrate restriction (ketogenic) with intermittent fasting (ketofastosis) have also proven successful in reducing the BMI of obese individuals to within the normal range [16]. Although the effectiveness of intermittent fasting has been extensively documented, a clear research gap exists. Most prior studies have focused on populations comprising clinical or institutional workers, individuals with chronic diseases, or animal models. For instance, the effectiveness of IF has frequently been tested on groups of obese employees in Jakarta [4][14], civil servants in Aceh Province [10], patients with diabetes mellitus and metabolic syndrome [2], or in vivo tests on hyperglycemic rats and mice [11][13].

Results from the 2023 SKI survey indicate an increase in the prevalence of obesity among Indonesian adults aged 18 and older, rising from 21.8% in 2018 to 23.4% in 2023. Empirical research into the effectiveness and direct impact of

intermittent fasting on local university student populations a demographic vulnerable to irregular sleep patterns, poor stress management, and highly fluctuating eating schedules remains extremely limited. Notably, this phenomenon has not yet been examined within the academic environment of Universitas Muhadi Setiabudi.

Given the background of the issue and the identified research gap, it is crucial to explore the effectiveness of intermittent fasting (IF) interventions within the specific context of a university student population. Therefore, this study aims to empirically identify and analyze the impact of intermittent fasting on anthropometric parameters specifically body weight and Body Mass Index (BMI) among students at Universitas Muhadi Setiabudi. The research focuses on students at a regional (suburban) university such as Universitas Muhadi Setiabudi in Brebes who exhibit unique lifestyle characteristics: fluctuating academic activity rhythms, limited access to structured sports facilities, and highly variable meal schedules compared to urban working populations or clinical patients.

2. Research Methods

This study employed a quantitative pre-experimental design, specifically the One-Group Pretest-Posttest Design. The study population consisted of students from Muhadi Setiabudi University, with the sample selected using a purposive sampling technique. This technique was chosen to ensure a representative and standardized sample based on specific criteria (criterion-based selection), thereby controlling for confounding variables that could potentially influence physiological and metabolic responses during the fasting period. Inclusion criteria were: active students at Muhadi Setiabudi University aged 18–22 years; having an overweight or "normal-at-risk" nutritional status based on baseline Body Mass Index (BMI) measurements; willingness and full commitment to adhere to the intermittent fasting

protocol; and not currently following any other specific diet program. Exclusion criteria were established to eliminate medical and physiological risk factors, including: a history of chronic metabolic diseases (such as diabetes mellitus, renal disorders, or severe cardiometabolic abnormalities); a history of eating disorders; current use of hormonal medications or weight-loss supplements; and pregnancy or breastfeeding. Through the application of these structured criteria, a sample of 40 respondents ($n = 40$) was purposively selected, accurately and validly representing the homogeneous characteristics of the target population. Participants were instructed to follow the intermittent fasting diet for the designated intervention period. Data collection instruments included a calibrated digital scale and a stadiometer for height measurement, which were subsequently used to calculate Body Mass Index (BMI) values. Data analysis was performed using statistical software to conduct descriptive statistics and a parametric Paired Sample T-Test to assess differences in mean body weight and BMI before and after the intermittent fasting intervention. The threshold for statistical significance was set at $p < 0.05$.

3. Results and Discussion

Descriptive analysis was used to describe the mean and standard deviation of body weight and BMI among 40 respondents before and after the intermittent fasting intervention. The results of the descriptive analysis are presented in Table 1.

Table 1. Distribution of Mean Body Weight and BMI of Respondents ($n=40$)

Variable	N	Mean $\pm$ SD	Min-Max
BW Before	40	49,31 $\pm$ 9,86	28,80-86,30
BW After	40	48,26 $\pm$ 9,26	30,00-67,50
BMI Before	40	20,85 $\pm$ 4,05	13,51-28,83
BMI After	40	20,40 $\pm$ 3,76	14,10-29,42

Based on Table 1, the respondents' mean body weight prior to the intervention was 49.31 kg, decreasing to 48.26 kg following the intervention. A

corresponding decrease was observed in the BMI value, which fell from 20.85 to 20.40. To determine the significance of this reduction, a bivariate Paired Sample T-test was conducted; a prior normality test using the Shapiro-Wilk method had confirmed a normal distribution ($p > 0.05$). The bivariate data are presented in Table 2.

Table 2. Paired Sample T-Test Results for Body Weight and BMI

Variable Pair	Mean Difference $\pm$ SD	t	P-Value (Sig.)
BW Before - BW After	1,045 $\pm$ 1,68	3,928	0,000
BMI Before - BMI After	0,448 $\pm$ 0,71	3,996	0,000

Table 2 shows that the p-value for the difference in body weight and BMI before and after the intervention is 0.000. Since the p-value is less than 0.05, it can be concluded that intermittent fasting has a statistically significant effect on the reduction of the respondents' body weight and BMI.

These findings are consistent with various studies confirming that intermittent fasting can significantly induce reductions in body weight and body fat composition. [1][3]. The primary mechanism of weight loss through fasting is the creation of an energy deficit and a biochemical transition. During the fasting period, liver glycogen stores are depleted, causing the body to switch to using fat reserves as its main energy source through the process of lipolysis. [8]. This metabolic shift not only reduces fat mass but also simultaneously optimizes insulin sensitivity and suppresses pro-inflammatory cytokines, ultimately leading to an improvement in overall metabolic health [4]. Research findings indicate that the average weight loss among respondents was 1.045 kg over the 4-week intervention period (an average of 0.26 kg/week). This magnitude of weight loss is considered moderate and falls within the clinically

safe range (0.25–0.5 kg/week). The 4-week intervention duration represents the initial phase of metabolic adaptation. During this short period, weight loss is primarily driven by the depletion of water-binding glycogen stores in the liver and muscles, followed by a gradual increase in the rate of lipolysis. More substantial weight loss (>2–4 kg) generally requires a longer intervention period (> 8–12 weeks).

Furthermore, intermittent fasting has also been reported to exert protective effects at the cellular level through the mechanism of autophagy. When nutrient intake ceases, the body's cells begin to clear away damaged or dysfunctional components, helping to reduce oxidative stress as evidenced by a decrease in plasma malondialdehyde (MDA) levels [9][14]. The combination of a low-carbohydrate diet and the high level of physiological adaptation during fasting also plays a role in successfully lowering blood pressure and controlling blood glucose spikes in individuals with dyslipidemia and hyperglycemia [7][13].

Beyond the benefit of reducing body mass, the practice of intermittent fasting has been shown not to adversely affect muscle mass, provided that nutritional balance and the body's circadian rhythm regarding sleep timing (sleep synchronization) are also optimized [3][8][15]. Clinical trials involving fasting based dietary interventions such as voluntary religious fasting (e.g., Ramadan, the Fast of David, and the Monday-Thursday fast), the 5:2 method, and time-restricted eating (TRE) have consistently demonstrated clinical benefits, including reductions in body weight indicators, improvements in blood pressure parameters, and decreases in cardiometabolic lipid levels [6][10][11][12]. This demonstrates that university students can utilize intermittent fasting as a practical and efficient dietary approach amidst their academic schedules without the need for complex daily calorie counting provided they maintain consistency in their eating windows.

4. Conclusion

The study concludes that the implementation of intermittent fasting significantly impacts weight loss and Body Mass Index (BMI) reduction among students at Muhadi Setiabudi University. The average reduction in weight (1.045 kg) and BMI (0.448 points) indicates a positive metabolic response to time-restricted eating. Intermittent fasting proves to be a practical, logical, and effective lifestyle intervention requiring minimal medical involvement for preventing and managing excess weight in young adults, while also offering additional benefits such as optimized cardiovascular metabolism and enhanced immune function.

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