

The Effect Of Intermittent Fasting On Body Mass Index: A Literature Review

Andiar Achmad Kautsar Putra Sartono^{a,b}, Linda Dewanti^c, Soebagijo Adi Soelistijo^d

^a andiar.achmad.kautsar-2020@fk.unair.ac.id

^b Medical Study Program, Faculty of Medicine, Universitas Airlangga, Mayjend Prof. Moestopo St. No. 47 60132, Surabaya, Indonesia

^c Department of Public Health, Faculty of Medicine, Universitas Airlangga, Mayjend Prof. Moestopo St. No. 47 60132, Surabaya, Indonesia

^d Department of Internal Medicine, Dr. Soetomo General Academic Hospital, Faculty of Medicine, Universitas Airlangga, Mayjend. Prof. Dr. Moestopo St. No. 6-8 60286, Surabaya, Indonesia

Abstract

Obesity is a complex multifactorial disease. It is a preventable disease and usually accompanied by overweight. Obesity has become a massive problem in the world nowadays since it affects around 1,9 billion (39%) adults in 2019. Intermittent fasting (IF) is the act of refraining from eating and drinking for a specific period of time. This method has existed for a long time and gained a lot of popularity in recent years. It is an affordable method to decrease individual body mass index (BMI) and ultimately reducing the number of overweight and obese individual in this world. Therefore, this review article aims to summarize the effect of IF on BMI change.

Keywords: Intermittent fasting; Body mass index

1. Introduction

Obesity, a complex multifactorial disease characterized by accumulated excess body fat, brings many negative effects to person's body. According to WHO, Obesity is defined when person's body mass index (BMI), the result of person's weight divided by the square of their height, is greater than or equal to 30 kg/m² (WHO, 2021). It increases the likelihood of various disease as well as its mortality. Type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), cardiovascular disease (CVD), hyperlipidemia, and metabolic syndrome (MetS) are some common conditions that can be cause by obesity. (Lin and Li, 2021)

Obesity is a massive problem nowadays. The number of the worldwide obesity sufferer has tripled since 1975. According to WHO, there are 1,9 billion (39%) adult that were overweight in 2016. Among them, 650 million (13%) were obese. In 2020, there are 39 million of children under age of 5 were overweight or obese. This has become serious problem. Fortunately, obesity can be prevented. (WHO, 2021)

Intermittent fasting is the act of refraining from eating and drinking for a specific period. This method has been in existence for a long time and has gained popularity in recent years. In October 2016, searches using the keywords "intermittent alternate-day fasting diet" reached over 210,000 times. The concept of this method is to restrict energy intake to the body during a specific time frame. This approach has been proven to enhance the overall health quality for those who practice it. (Patterson and Sears, 2017).

There are several methods of intermittent fasting. The three main methods are alternate day fasting, modified fasting regiments, and time-restricted feeding. In the alternate day fasting method, there are two

types of days: fasting days and feasting days. On fasting days, individuals practicing this method are not allowed to consume any calories. Conversely, on feasting days, they are free to eat as they please. The modified fasting regimens restrict the energy intake of participants to only 20-25% of their daily energy requirements during fasting days. This method is also referred to as intermittent energy restriction. The modified fasting regimen forms the basis of the 5:2 diet (5 days of regular eating and 2 days of fasting), which is currently popular. Whereas, time-restricted feeding is a method where the participant can only eat on a specific time range (Patterson and Sears, 2017).

2. Method

We searched PubMed online database by entering term (intermittent fasting) AND (body mass index) in advanced search menu. Then we select the appropriate article from the search result. After that, we compare the result of each included article to examine the effect of intermittent fasting in individual's body mass index (BMI).

3. Result

3.1 Yin et al., 2021

This is a systematic review and meta-analysis that include six eligible study according to the inclusion criteria set by the author. There are 1 study that had one comparator and included two datasets. Two studies used the same population and included one dataset. There are total of six BMI datasets that included in this meta-analysis. The meta-analysis shows that intermittent fasting has statistically significant effect on individual's BMI reduction (MD, -0.50, 95% CI from -0.93 to -0.07, $p = 0.02$) (Figure 1). Negative values favor fasting because the fasting group experienced more reduction in BMI than did the control group. (Yin et al., 2021)

3.2 Fernando et al., 2019

This is a systematic review and meta-analysis of the effect of Ramadan fasting on individual weight and body composition. After the study selection process, there were 70 studies included in this study. When assessing the change in participant's weight between pre Ramadan and post Ramadan, it shows that participants undergo a significant decrease in their weight (-1.34 (95% CI: -1.61 to -1.07) kg, $p < 0.001$). By follow-up, there was still a significant decrease in weight compared to pre-R (-0.59 (-0.99 to -0.20) kg, $p = 0.003$). (Fernando et al., 2019)

3.3. Welton et al., 2020

This systematic review and meta-analysis included 27 eligible studies with after the study selection process has been conducted by the authors with total of 944 participants included in these studies. The correlation between intermittent fasting and weight loss were assessed. Across all 27 studies, weight loss was observed, ranging from 0.8% to 13.0% of the baseline body weight. Among the 16 studies lasting 2 to 12 weeks that measured BMI, there was an average decrease of 4.3%, resulting in a median BMI of 33.2 kg/m². Twelve studies compared intermittent fasting to calorie-restricted diets, revealing comparable weight loss in both groups. The study duration varied from 8 weeks to 1 year, involving a total of 1206 participants (527 practicing intermittent fasting, 572 using calorie restriction, and 107 control participants), demonstrating weight loss ranging from 4.6% to 13.0%. (Welton et al., 2020)

Most of the weight loss with IF is fat loss. A 2011 study by Harvie et al calculated that 79% of weight loss was owing to loss of fat specifically. (Welton et al., 2020)

Ramadan serves as a culturally influenced illustration of intermittent fasting (IF) for numerous Muslims, with fasting typically lasting around 14 hours per day over a 30-day period. This real-world scenario

provides an opportunity to investigate the impacts of fasting. Eight Ramadan studies examined weight loss in obese adult with total participants of 856 individual. The results show that participants is losing weight ranging from 1,0 to 1,8 Kg after Ramadan fasting ended. (Welton et al., 2020)

4. Conclusion

Intermittent fasting (IF) shows a promising potential as a nonpharmacologic therapy for reducing individual BMI. The three systematic review and meta-analysis included in this review show a significant decrease in participant's body weight and BMI after IF intervention. Therefore, intermittent fasting can be an affordable solution to decrease the overweight and obesity prevalence in the future.

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References

- Fernando, H.A. et al. (2019) 'Effect of Ramadan Fasting on Weight and Body Composition in Healthy Non-Athlete Adults: A Systematic Review and Meta-Analysis', *Nutrients*, 11(2), p. 478. Available at: <https://doi.org/10.3390/nu11020478>.
- Lin, X. and Li, H., 2021 'Obesity: Epidemiology, Pathophysiology, and Therapeutics', *Frontiers in Endocrinology*, 12, p. 706978. Available at: <https://doi.org/10.3389/fendo.2021.706978>.
- Obesity and overweight, 2021 World Health Organization. Available at: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight> (Accessed: 29 December 2023).
- Patterson, R. and Sears, D., 2017. Metabolic Effects of Intermittent Fasting. *Annual Review of Nutrition*, [online] 37(1), pp.371-393. Available at: https://www.annualreviews.org/doi/10.1146/annurev-nutr-071816-064634?url_ver=Z39.88-2003&rft_id=ori%3Arid%3Aacrossref.org&rft_dat=cr_pub++0pubmed [Accessed 8 August 2022].
- Welton, S. et al. (2020) 'Intermittent fasting and weight loss: Systematic review', *Canadian Family Physician Medecin De Famille Canadien*, 66(2), pp. 117–125.
- Yin, C. et al. (2021) 'Effect of Intermittent Fasting on Non-Alcoholic Fatty Liver Disease: Systematic Review and Meta-Analysis', *Frontiers in Nutrition*, 8, p. 709683. Available at: <https://doi.org/10.3389/fnut.2021.709683>.